# Digital I/O Boards Comparison Chart

## *Part 1 of 3*

*(continued on pg. 151)*

| Part # | Price | Bus | Page Number | Total Number of Digital I/O Lines | I/O Configuration | Digital I/O Specifications: I/O & Speed: Maximum Data Transfer Rate | Digital I/O Specifications: I/O & Speed: Program I/O | Digital I/O Specifications: I/O & Speed: Interrupt Driven | Digital I/O Specifications: I/O & Speed: DMA Mode | Digital I/O Specifications: Transfer Modes: Bidirectional | Digital I/O Specifications: Transfer Modes: 16/32-bit Data Transfers | Digital I/O Specifications: Transfer Modes: Output Current Sink, Max. | Digital I/O Specifications: Other Features: Counter/Timer-Controlled I/O | Digital I/O Specifications: Other Features: Other Features (see our website for details) | Counter/Timer Specs: Number of Channels | Counter/Timer Specs: Maximum Frequency | Counter/Timer Specs: Alarm Registers | Counter/Timer Specs: Cascadable 16-bit Counters | Counter/Timer Specs: 24-Hour Time-of-Day Mode | Counter/Timer Specs: Principal Connectors (**M**ale/**F**emale): **BNC**=BNC; **C**=HD Centronics; **D**=D-Sub; **H**=Header; **R**=Robinson-Nugent; **S**=SCSI-II style; **T**=Screw terminals; **V**=VHD Centronics | Opto 22-Compatible Connector | Third-Party Software Support (see list of names below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **#IPDIO 7060** | $275 | ETH | 153 | 12 | 6 Mech. Relays, 6 Isolated Inputs | Out: 66 Hz In: 500 Hz | Y | – | – | – | – | 5 A | Y | Op: -13 to +167°F 32-bit Counters | 6 | 500 Hz | – | – | – | 23T and 1 RJ-45 Eth. | – | LV |
| **#UMDIO 24L** | $95 | USB | 155 | 24 | 2 x 8 & 2 x 4 bits or 3 x 8 bits | 33 Hz | Y | – | – | Y | – | 2.5 mA | Y | Operating Temp: +32 to +158°F | 1 | 1 MHz | – | – | – | 40 T | – | D, LV, UDR |
| **#UMDIO 24LH** | $185 | USB | 155 | 24 | 2 x 8 & 2 x 4 bits or 3 x 8 bits | 33 Hz | Y | – | – | Y | – | 64 mA | Y | Operating Temp: +32 to +158°F | 1 | 1 MHz | – | – | – | 40 T | – | D, LV, UDR |
| **#UMCTM 05** | $245 | USB | 155 | 16 | 8 In/8 Out | – | Y | Y | – | – | – | 24 mA | Y | Input port for firmware routines | 5 | 20 MHz | – | Y | – | 56 T | – | D, LV, UDR |
| **#UMCTM 10** | $345 | USB | 155 | 16 | 8 In/8 Out | – | Y | Y | – | – | – | 24 mA | Y | Input port for firmware routines | 10 | 20 MHz | – | Y | – | 56 T | – | D, LV, UDR |
| **#UMQUAD 08** | $595 | USB | Call | 8 | 8 Individual | – | Y | Y | – | – | – | 500 mA Sink, 50Vdc max. | Y | 8 Simultaneous Quadrature In. | 8 | 10 MHz | – | Y | – | 80 T and 2 x 37 DM | – | D, LV, UDR |
| **#UCDIO 96H** | $395 | USB | 155 | 96 | 8 x 8 bits, 8 x 4 bits | 8 kHz | Y | – | – | Y | – | 64 mA | Y | Operating Temp: +32 to +158°F | 1 | 1 MHz | – | – | – | 104 T and 4 x 50 H | – | D, LV, UDR |
| **#UCDIO 96HD** | $295 | USB | 155 | 96 | 8 x 8 bits, 8 x 4 bits | 8 kHz | Y | – | – | Y | – | 64 mA | Y | Operating Temp: +32 to +158°F | 1 | 1 MHz | – | – | – | 2 x 50H | – | D, LV, UDR |
| **#UCPDISO 8** | $295 | USB | 155 | 16 | 8 Mech. Relays, 8 Isolated Inputs | 5 kHz | Y | – | – | – | – | 6A@240Vac or 28Vdc | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 40 T | – | D, LV, UDR |
| **#UCPDISO 8HD** | $295 | USB | 155 | 16 | 8 Mech. Relays, 8 Isolated Inputs | 5 kHz | Y | – | – | – | – | 6A@240Vac or 28Vdc | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 1 x 40H | – | D, LV, UDR |
| **#UCSSR 08** | $345 | USB | 155 | 8 | 2 x 4 bits | 4 kHz | Y | – | – | Y | – | – | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 16 T | – | D, LV, UDR |
| **#UCSSR 24** | $395 | USB | 155 | 24 | 2 x 8 bits, 2 x 4 bits | 8 kHz | Y | – | – | Y | – | – | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 48 T | – | D, LV, UDR |
| **#UCERB 08** | $245 | USB | 155 | 8 | 2 x 4 Mechanical Relays | 66 Hz | Y | – | – | – | – | 6 A | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 24 T | – | D, LV, UDR |
| **#UCERB 24** | $345 | USB | 155 | 24 | 2 x 8 and 2 x 4 Mech. Relays | 66 Hz | Y | – | – | – | – | 6 A | – | Operating Temp: +32 to +158°F | – | – | – | – | – | 72 T | – | D, LV, UDR |
| **#URDIO 24** | $295 | USB | Call | 24 | 3 x 8 bits | 10 kHz | Y | – | – | Y | – | 2 mA | – | – | – | – | – | – | – | 1 x 25DM | – | LV, TP |
| **#URDIO 48C** | $495 | USB | Call | 48 | 6 x 8 bits | 10 kHz | Y | – | – | Y | – | 2 mA | Y | – | 6 | 5 MHz | – | Y | – | 3 x 25DM | – | LV, TP |
| **#URDIO 72** | $395 | USB | Call | 72 | 9 x 8 bits | 10 kHz | Y | – | – | Y | – | 2 mA | – | – | – | – | – | – | – | 3 x 25DM | – | LV, TP |
| **#URDIO 96C** | $595 | USB | Call | 96 | 12 x 8 bits | 10 kHz | Y | – | – | Y | – | 2 mA | Y | – | 6 | 5 MHz | – | Y | – | 5 x 25DM | – | LV, TP |
| **#URDIO 120** | $395 | USB | Call | 120 | 15 x 8 bits | 10 kHz | Y | – | – | Y | – | 2 mA | – | – | – | – | – | – | – | 5 x 25DM | – | LV, TP |
| **#UREL 04SER** | $245 | USB | Call | 8 | 4 Mech. Relays, 4 Isolated Inputs | 25 kHz | Y | – | – | – | – | 0.5A @ 125Vac 1A @ 24Vdc | – | 2 Serial Ports RS-232/422/485 | – | – | – | – | – | 2 x 9DM 1 x 25DF | – | DAQ, LV |
| **#PXIDIO 3280** | $845 | PXI | Call | 32 | 16 In & 16 Out, 32 In, or 32 Out | 20 MHz | Y | – | Y | Y | Y | 48 mA | Y | 64KB FIFO DMA, 80 MB/s | 3 | 20 MHz | – | – | – | 1 x 100S | – | DAQ, D, LV, NT |
| **#PXIDIO 48H** | $345 | PXI | Call | 48 | 4 x 8 bits, 4 x 4 bits | 500 kHz | Y | Y | – | Y | – | 24 mA | Y | Direct interface with Opto-22 | 2 | – | – | – | – | 1 x 100S | Y | DAQ, D, LV, NT |
| **#PXIDIO ISO32** | $295 | PXI | Call | 32 | 16 Isolated In, 16 Isolated Out | 10 kHz | Y | Y | – | – | – | 140 mA | – | Optical Isolation 5000Vrms | – | – | – | – | – | 1 x 50S | – | DAQ, D, LV, NT |
| **#PXISO 08** | $295 | PXI | Call | 24 | 16 Isolated In, 8 Relays Out | – | Y | – | – | – | – | 0.5A/120Vac 1A/24Vdc | – | DI Optical Isol. 5000Vrms | – | – | – | – | – | 1 x 50S | – | DAQ, D, LV, NT |
| **#CYDIO 24E** | $245 | PCIe | Call | 24 | 2 x 8 bits, 2 x 4 bits | 200 kHz | Y | Y | – | Y | – | 2.5 mA | – | Programmable pull up/down res. | – | – | – | – | – | 1 x 37DM | – | LV, UDR |
| **#CYDIO 96HE** | $395 | PCIe | 153 | 96 | 8 x 8 bits, 4 x 4 bits | 220 kHz W 200 kHz R | – | Y | – | Y | – | 64 mA | – | Programmable pull up/down res. | – | – | – | – | – | 1 x 100R | – | LV, UDR |
| **#CYCTM 05P** | $245 | PCI (5V) | 164 | 16 | 8 In/8 Out | – | Y | Y | – | – | – | 24 mA | Y | 50ppm Xtal | 5 | 6.8 MHz | – | Y | – | 1 x 37DM | – | LTN, LV, NT, UDR |
| **#CYCTM 10P** | $395 | PCI (5V) | 164 | 32 | 16 In/16 Out | – | Y | – | – | – | – | 24 mA | Y | 50ppm Xtal | 10 | 6.8 MHz | – | Y | – | 2 x 37DM | – | LTN, LV, NT, UDR |
| **#CYCTM 20HU** | $495 | PCI | Call | – | – | – | Y | – | – | – | – | – | – | – | 20 | 6.8MHz | – | Y | – | 1 x 100SM | – | LTN, LV, UDR |
| **#CYDIO 24HP** | $175 | PCI (5V) | 159 | 24 | 2 x 8 bits, 2 x 4 bits | 200 kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 37DM | – | D, LTN, LV, NT, UDR |
| **#CYDIO 24P** | $105 | PCI (5V) | 159 | 24 | 2 x 8 bits, 2 x 4 bits | 200 kHz | Y | Y | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 1 x 37DM | – | D, LTN, LV, NT, UDR |
| **#CYDIO 24LU** | $175 | PCI | Call | 24 | 2 x 8 bits, 2 x 4 bits | – | Y | Y | – | Y | – | 64 mA | – | Low profile | 2 | 32 MHz | – | Y | – | 1 x 68VF | – | LTN, SM, UDR |
| **#CYDIO 24U-S** | $195 | PCI | Call | 24 | 2 x 8 bits, 2 x 4 bits | – | Y | Y | – | Y | – | 64 mA | – | 8 kV (contact) ESD protection | 3 | – | – | Y | – | 1 x 37DM | – | LTN, SM, UDR |
| **#CYDIO 48HP** | $235 | PCI (5V) | 159 | 48 | 4 x 8 bits, 4 x 4 bits | 200 kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, UDR |
| **#CYDIO 96HP** | $295 | PCI (5V) | 159 | 96 | 8 x 8 bits, 8 x 4 bits | 410 kHz W 340 kHz R | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 100R | – | LTN, LV, NT, UDR |
| **#CYDIO 96P** | $265 | PCI (5V) | 159 | 96 | 8 x 8 bits, 8 x 4 bits | 200 kHz | Y | Y | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 1 x 100R | – | LTN, LV, NT, UDR |
| **#CYDUAL AC5P** | $195 | PCI (5V) | 157 | 48 | 4 x 8 bits, 4 x 4 bits | – | Y | – | – | Y | – | 64 mA | – | Easy cabling to Opto/Gordos Racks | | – | – | – | – | 1 x 100R | – | UDR |
| **#CYINT 32P** | $195 | PCI (5V) | Call | 40 | 40 Indiv. | 200 kHz | Y | Y | – | Y | – | 3.2 mA | Y | Vector Interrupt or DIO or CTRs | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, UDR |
| **#CYPDISO 8P** | $295 | PCI (5V) | 157 | 16 | 8 Mech. Relays, 8 Isolated Inputs | – | Y | – | – | – | – | 6A@120Vac or 28Vdc | – | 500V Isolation; 5 SPDT, 3 SPST | – | – | – | – | – | 1 x 37DM | – | LTN, LV, NT, UDR |
| **#CYPDISO 16P** | $425 | PCI (5V) | 157 | 32 | 16 Mech. Relays, 16 Isolated Inputs | – | Y | – | – | – | – | 6A@120Vac or 28Vdc | – | 500V Isolation; 16 SPDT (Form C) | – | – | – | – | – | 2 x 50H | – | LTN, LV, NT, UDR |
| **#HDI 128** | $695 | PCI | 163 | 128 | 128 in | 20 kHz | Y | Y | – | – | 16 | – | Y | 2.5kVdc Isolation; 5–25Vdc Inputs | 1 | 10 MHz | – | – | – | 2 x 100VF | – | LV, NT |
| **#HDO 128** | $695 | PCI | 163 | 128 | 128 out | 20 kHz | Y | Y | – | – | 16 | 90 mA | Y | 2.5kVdc Isolation; 0–+40Vdc Outputs | 1 | 10 MHz | – | – | – | 2 x 100VF | – | LV, NT |
| **#HDIO ISO32LU** | $345 | PCI | 158 | 32 | 16 In/16 out | – | Y | Y | – | – | – | 200 mA | – | Low-Profile Card; 5–30Vdc Inputs | – | – | – | – | – | 1 x 44DF | – | LV |
| **#HPDISO 08** | $195 | PCI (5V) | 158 | 16 | 8 in/8 out | 50 Hz | Y | Y | – | – | – | 3A | – | 3.75kVdc Isol.; 8 SPDT Relays | – | – | – | – | – | 1 x 37DF | – | LV |
| **#HPDISO 08LU** | $275 | PCI | 158 | 16 | 8 in/8 out | 110 Hz | Y | Y | – | – | – | 0.2A@240Vac 1A@30Vdc | – | 2.5kVdc Isolation; 8 DPDT Relays | – | – | – | – | – | 1 x 44DF | – | LV |
| **#HPDISO 16** | $275 | PCI (5V) | 158 | 32 | 16 In/16 Out | 100 Hz | Y | Y | – | – | – | 0.5A@125Vac 1A@30Vdc | – | 2.5kVdc Isolation; 8 SPDT Relays | – | – | – | – | – | 1 x 62DF | – | LV |
| **#PCICTM 12** | $375 | PCI (5V) | 160 | 16 | 8 in/8 out | – | Y | Y | – | – | – | 8 mA | Y | Includes drivers for DOS & Windows 95 | 12 | 10 MHz | – | Y | – | 1 x 100SF | – | DAQ, D, LV, NT |
| **#PCIDIO 24H** | $120 | PCI (5V) | 160 | 24 | 2 x 8 bits, 2 x 4 bits | 500 kHz | Y | Y | – | Y | – | 24 mA | Y | Operating Temp: +32 to +140°F | 2 | 2 MHz | – | – | – | 1 x 50H | Y | DAQ, D, LV, NT |
| **#PCIDIO 48H** | $225 | PCI (5V) | 160 | 48 | 4 x 8 bits, 4 x 4 bits | 500 kHz | Y | Y | – | Y | – | 24 mA | Y | Operating Temp: +32 to +140°F | 3 | – | – | – | – | 2 x 50H | Y | DAQ, D, LV, NT |

**Bus:** **ETH** = Ethernet; **ISA** = ISA 16-bit (AT); **ISA-8** = Use in any ISA slot: 8-bit (XT) or 16-bit (AT); **PCI** = PCI 3.3V & 5V; **PCI (5V)** = PCI 5V; **PCIe** = PCI Express slot; **PCM** = PCMCIA Type II (PC Card); **PC/104** = PC/104 expansion conn; **PXI** = PXI slot; **RS-485** = RS-485 (serial) port; **USB** = USB 1.1 or faster port.

**Third-Party Software Support:** **D** = DASY*Lab*®; **DAQ** = DAQBench™; **LTN** = Notebook®; **IT** = Intellution FIX DMACS; **LV** = LabVIEW®; **NT** = Windows NT; **SM** = Snap-Master®; **TP** = TestPoint®; **UDR** = Universal Driver Library

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# Digital I/O Boards Comparison Chart

## *Part 2 of 3*

*(continued from pg. 150)*

| Part # | Price | Bus | Page Number | Total Number of Digital I/O Lines | I/O Configuration | Digital I/O Specifications: I/O & Speed: Maximum Data Transfer Rate | Digital I/O Specifications: Transfer Modes: Program I/O | Digital I/O Specifications: Transfer Modes: Interrupt Driven | Digital I/O Specifications: Transfer Modes: DMA Mode | Digital I/O Specifications: Transfer Modes: Bidirectional | Digital I/O Specifications: Transfer Modes: 16/32-bit Data Transfers | Digital I/O Specifications: Other Features: Output Current Sink, Max. | Digital I/O Specifications: Other Features: Counter/Timer-Controlled I/O | Digital I/O Specifications: Other Features: Other Features (see our website for details) | Counter/Timer Specs: Number of Channels | Counter/Timer Specs: Maximum Frequency | Counter/Timer Specs: Alarm Registers | Counter/Timer Specs: Cascadable 16-bit Counters | Counter/Timer Specs: 24-Hour Time-of-Day Mode | Counter/Timer Specs: Principal Connectors (**M**ale/**F**emale); **BNC**-BNC; **C**=HD Centronics; **D**=D-Sub; **H**=Header; **R**=Robinson-Nugent; **S**=SCSI-II Style; **T**=Screw terminals; **V**=VHD Centronics | Opto 22-Compatible Connector | Third-Party Software Support (see list of names below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **#PCIDIO 48HA** | $245 | PCI (5V) | Call | 48 | 6 x 8 bits | 500kHz | Y | Y | – | Y | – | 48mA sink, 15mA source | Y | High Current Sink or Source/Drive | 2 | 10 MHz | – | – | – | 1 x 100S | – | DAQ, D, LV, NT |
| **#PCIDIO 96H** | $375 | PCI (5V) | 160 | 96 | 8 x 8 bits, 8 x 4 bits | 500kHz | Y | Y | – | Y | – | 24 mA | Y | Operating Temp: +32 to +140°F | 3 | – | – | – | – | 4x 50H | Y | DAQ, D, LV, NT |
| **#PCIDIO 96HA** | $395 | PCI (5V) | Call | 96 | 12 x 8 bits | 500kHz | Y | Y | – | Y | – | 48mA sink, 15mA source | Y | High Current Sink or Source/Drive | 3 | – | – | – | – | 1 x 100SF | Y | DAQ, D, LV, NT |
| **#PCIDIO 3212** | $395 | PCI (5V) | 162 | 64 | 32 Inputs, 32 Outputs | 12MHz | Y | Y | Y | – | 32 | 24 mA | Y | 32-bit FIFO; Bus-Master DMA | 2 | – | – | – | – | 1 x 37DF, 1 x 40H | Y | DAQ, D, LV, NT |
| **#PCIDIO 3212L** | $495 | PCI | 162 | 64 | 32 Inputs, 32 Outputs | 12MHz | Y | Y | Y | – | 32 | 24 mA | Y | 32-bit FIFO; Low-Profile Card | 2 | – | – | – | – | 2 x 37DF | Y | DAQ, D, LV, NT |
| **#PCIDIO 3240** | $995 | PCI (5V) | 162 | 40 | 2 x 16 bits, 4 inputs, 4 outputs | 40MHz | Y | Y | Y | Y | 32 | 8 mA | Y | Two 32K FIFOs; 40 MHz Data Xfers | 1 | 20 MHz | – | – | – | 1 x 100SF | Y | DAQ, D, LV, NT |
| **#PCIDIO IS032** | $345 | PCI (5V) | 161 | 32 | 16 Isolated Inputs, 16 Isol. Outputs | 20kHz | Y | Y | – | – | – | 200 mA | – | 0-24Vdc inputs; 5000Vrms Isol. | – | – | – | – | – | 1x 37DF | – | DAQ, D, LV, NT |
| **#PCIDIO IS032-I** | $345 | PCI (5V) | 161 | 32 | 32 Isolated Inputs, w/ COS detection | 10kHz | Y | Y | – | – | 32 | – | – | 0-24Vdc inputs; 5000Vrms Isol. | – | – | – | – | – | 1x 37DF | – | DAQ, D, LV, NT |
| **#PCIDIO IS032-O** | $345 | PCI (5V) | 161 | 32 | 32 Isolated Outputs, 40V Open-Collector | 20kHz | Y | Y | – | – | – | 200 mA | – | 2500Vrms Isol.; +32 to +140°F | – | – | – | – | – | 1x 37DF | – | DAQ, D, LV, NT |
| **#PCIDIO IS064** | $495 | PCI (5V) | 161 | 64 | 32 Isolated Inputs, 32 Isol. Outputs | 10kHz | Y | Y | – | – | – | 500 mA | Y | 0-24Vdc inputs; 5000Vrms Isol. | – | – | – | – | – | 1 x 100SF | – | DAQ, D, LV, NT |
| **#PCIDIO IS064-I** | $495 | PCI (5V) | 161 | 64 | 64 Isolated Inputs | 10kHz | Y | Y | – | – | – | – | Y | 0-24Vdc inputs; 2500V Isolation | – | – | – | – | – | 1 x 100SF | – | DAQ, D, LV, NT |
| **#PCIDIO IS064-O** | $495 | PCI (5V) | 161 | 64 | 64 Isolated Outputs | 10kHz | Y | Y | – | – | – | 500 mA | Y | — | – | – | – | – | – | 1 x 100SF | – | DAQ, D, LV, NT |
| **#PCISO 08R** | $245 | PCI (5V) | 161 | 16 | 8 Mech. Relays, 8 Isolated Inputs | 50 kHz DC, 500 Hz AC | Y | – | – | – | – | 0.5A@120Vac 1A@24Vdc | – | Operating Temp: +32 to +140°F | – | – | – | – | – | 1x 37DF | – | DAQ, D, LV, NT |
| **#PCISO 16LR** | $395 | PCI | 161 | 32 | 16 Latching Relays, 16 Isolated Inputs | 200Hz | Y | – | – | – | – | 0.5A@125Vac 1A@30Vdc | – | Relay outputs stay latched **ON** or **OFF** | – | – | – | – | – | 1 x 68SF | – | DAQ, LV, NT |
| **#PCISO 32MR** | $395 | PCI | 161 | 34 | 2 Isolated Inputs, 32 Relay Outputs | – | Y | – | – | – | 32 | 120mA cont. 300mA peak | – | High-Speed 350V PhotoMOS relays | – | – | – | – | – | 1 x 68SF | – | DAQ, LV, NT |
| | | | | | | | | | | | | | | | | | | | | | | |
| **#ATCTM 10** | $195 | ISA | Call | 24 | 16 d.i. (clk/gate), 8 outputs | 500kHz | Y | Y | – | – | – | 24 mA | Y | Input lines shared, with clk/gate inputs. | 10 | 8 MHz | – | Y | – | 1 x 37DF | – | NT |
| **#ATDIO 144H** | $245 | ISA | Call | 144 | 12 x 8 bits, 12 x 4 bits | 500kHz | Y | Y | – | Y | – | 24 mA | – | Opto22 pinout; PCL-722 compat. | – | – | – | – | – | 6 x 50H | Y | D, LTN, LV, NT |
| **#ATDIO IS032** | $175 | ISA | Call | 64 | 32 isol (16 i/16 o) & 32 ttl (16in/16out) | 10kHz | Y | – | – | – | – | 16@200mA 16@24mA | – | 32 Isolated I/O; PCL-730 compat. | 3 | 2 MHz | – | – | – | 1 x 37DF & 2 x 20H | – | LV, NT |
| **#ATISO 08** | $145 | ISA-8 | Call | 16 | 8 relay outputs 8 isolated inputs | 10kHz | Y | – | – | – | – | 8@1A out 8@5-24V in | – | 4 spdt / 4 spst PCL-725 compat. | – | – | – | – | – | 1 x 37DF | – | D, LTN, LV, NT |
| **#ATISO 16** | $225 | ISA | Call | 32 | 16 relay outputs 16 isolated inputs | 10kHz | Y | – | – | – | – | 16@1A out 16@5-24V in | – | 8 SPDT relays, 8 SPST relays | – | – | – | – | – | 2 x 37DF | – | LV, NT |
| **#ATMFC 48H** | $125 | ISA | Call | 48 | 4 x 8 bits, 4 x 4 bits | 500kHz | Y | Y | – | Y | – | 24 mA | – | Opto22 pinout; Event Counter | 3 | 2 MHz | – | – | – | 2 x 50H | Y | LV, NT |
| **#CYCTM 05** | $245 | ISA-8 | 164 | 16 | 8 In/8 Out | – | Y | Y | – | – | – | 8 mA | Y | 100ppm Xtal | 5 | 7 MHz | 2 Ch | Y | Y | 1 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 05X** | $345 | ISA-8 | 164 | 16 | 8 In/8 Out | – | Y | Y | – | – | – | 8 mA | Y | 50ppm Xtal | 5 | 7 MHz | 2 Ch | Y | Y | 1 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 10** | $495 | ISA-8 | 164 | 32 | 16 In/16 Out | – | Y | Y | – | – | – | 8 mA | Y | 100ppm Xtal | 10 | 7 MHz | 2 Ch | Y | Y | 2 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 10X** | $595 | ISA-8 | 164 | 32 | 16 In/16 Out | – | Y | Y | – | – | – | 8 mA | Y | 50ppm Xtal | 10 | 7 MHz | 2 Ch | Y | Y | 2 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 10H** | $495 | ISA-8 | 164 | – | – | – | Y | Y | – | – | – | – | Y | 100ppm Xtal | 10 | 7 MHz | – | Y | Y | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 10HX** | $595 | ISA-8 | 164 | – | – | – | Y | Y | – | – | – | – | Y | 50ppm Xtal | 10 | 7 MHz | – | Y | Y | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#CYCTM 20H/HX** | H-$695 HX-$795 | ISA-8 | 164 | – | – | – | Y | Y | – | – | – | – | Y | **20H**: 100ppm Xtal **20HX**: 50ppm Xtal | 20 | 7 MHz | – | Y | Y | 2 x 50H | – | LTN, LV, NT, UDR |
| **#CYDI 48** | $175 | ISA-8 | Call | 48 | 6 x 8 bits | 200kHz | Y | – | – | Y | – | Inputs Only | – | – | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, UDR |
| **#CYDI 96** | $265 | ISA-8 | Call | 96 | 12 x 8 bits | 200kHz | Y | – | – | Y | – | Inputs Only | – | – | – | – | – | – | – | 2 x 50H | – | LV, NT, UDR |
| **#CYDI 192** | $345 | ISA-8 | Call | 192 | 24 x 8 bits | 200kHz | Y | – | – | Y | – | Inputs Only | – | – | – | – | – | – | – | 4 x 50H | – | LV, NT, UDR |
| **#CYDIO 24** | $145 | ISA-8 | 159 | 24 | 2 x 8 bits, 2 x 4 bits | 200kHz | Y | Y | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 1 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYDIO 24C** | $195 | ISA-8 | 159 | 24 | 2 x 8 bits, 2 x 4 bits | 200kHz | Y | Y | – | Y | – | 2.5 mA | – | – | 3 | 10 MHz | – | Y | – | 1 x 37DM | – | LTN, LV, NT, UDR |
| **#CYDIO 24H** | $165 | ISA-8 | 159 | 24 | 2 x 8 bits, 2 x 4 bits | 200kHz | Y | Y | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 37DM | – | D, LTN, LV, NT, SM, UDR |
| **#CYDIO 48** | $185 | ISA-8 | 159 | 48 | 4 x 8 bits, 4 x 4 bits | 200kHz | Y | – | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#CYDIO 48H** | $245 | ISA-8 | 159 | 48 | 4 x 8 bits, 4 x 4 bits | 200kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#CYDIO 96** | $245 | ISA-8 | 159 | 96 | 8 x 8 bits, 8 x 4 bits | 200kHz | Y | – | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 2 x 50H | – | D, LV, NT, SM, UDR |
| **#CYDIO 192** | $445 | ISA-8 | 159 | 192 | 16 x 8 bits, 16 x 4 bits | 200kHz | Y | – | – | Y | – | 2.5 mA | – | – | – | – | – | – | – | 4 x 50H | – | D, LV, NT, SM, UDR |
| **#CYDO 48H** | $245 | ISA-8 | Call | 48 | 6 x 8 bits | 200kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, UDR |
| **#CYDO 96H** | $345 | ISA-8 | Call | 96 | 12 x 8 bits | 200kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 2 x 50H | – | LV, NT, UDR |
| **#CYDO 192H** | $545 | ISA-8 | Call | 192 | 24 x 8 bits | 200kHz | Y | – | – | Y | – | 64 mA | – | – | – | – | – | – | – | 4 x 50H | – | LV, NT, UDR |
| **#CYDO 24HV** | $225 | ISA-8 | Call | 24 | 3 x 8 bits | 200kHz | Y | Y | – | Y | – | 500 mA @50V | – | – | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, UDR |
| **#CYDO 48HV** | $295 | ISA-8 | Call | 48 | 6 x 8 bits | 200kHz | Y | – | – | Y | – | 500mA @50V | – | – | – | – | – | – | – | 2 x 50H | – | LTN, LV, NT, TP, UDR |
| **#CYDUAL AC5** | $245 | ISA-8 | 157 | 48 | 6 x 8 bits | – | Y | – | – | Y | – | 64 mA | – | Replaces OPTO/Gordos | – | – | – | – | – | 2 x 50H | Y | LTN, LV, NT, SM, UDR |
| **#CYISO 48** | $725 | ISA-8 | 157 | 48 | 48 Isolated Inputs 5–24Vdc or Vac | – | Y | – | – | – | – | Inputs Only | – | 500V Isolation | – | – | – | – | – | 2 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#CYPDISO 8** | $295 | ISA-8 | 157 | 16 | 8 Mech. Relays, 8 Isolated Inputs | – | Y | – | – | – | – | 5A@120Vac 6A@28Vdc | – | 500V Isolation, 5 SPDT, 3 SPST | – | – | – | – | – | 1 x 37DM | – | LTN, LV, NT, SM, UDR |
| **#CYPDISO 16** | $545 | ISA-8 | 157 | 32 | 16 Mech. Relays, 16 Isolated Inputs | – | Y | – | – | – | – | 5A@120Vac 6A@28Vdc | – | 500V Isolation, 10 SPDT, 6 SPST | – | – | – | – | – | 2 x 50H | – | LTN, LV, NT, SM, UDR |
| **#CYREL 08** | $245 | ISA-8 | 157 | 8 | 8 Relays | 33Hz | Y | – | – | – | – | 5A@120Vac 6A@28Vdc | – | 500V Isolation SPDT Relays | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, SM, TP, UDR |

**Bus:** **ETH** = Ethernet; **ISA** = ISA 16-bit (AT); **ISA-8** = Use in any ISA slot: 8-bit (XT) or 16-bit (AT); **PCI** = PCI 3.3V & 5V; **PCI (5V)** = PCI 5V; **PCIe** = PCI Express slot; **PCM** = PCMCIA Type II (PC Card); **PC/104** = PC/104 expansion conn; **PXI** = PXI slot; **RS-485** = RS-485 (serial) port; **USB** = USB 1.1 or faster port.

**Third-Party Software Support:** **D**=DASY*Lab*®; **DAQ**=DAQBench™; **LTN**=Notebook®; **IT**=Intellution FIX DMACS; **LV**=LabVIEW®; **NT**=Windows NT; **SM**=Snap-Master®; **TP**=TestPoint®; **UDR**=Universal Driver Library

**Quantity Discounts: 1-4/List 5-9/5% 10-24/10% 25+/Call** **Quantities of a Single Item Per Shipment – Call for Details**

# Digital I/O Boards Comparison Chart

## *Part 3 of 3*

*(continued from pg. 151)*

| Part # | Price | Bus | Page Number | Total Number of Digital I/O Lines | I/O Configuration | Digital I/O Specifications: I/O & Speed: Maximum Data Transfer Rate | Digital I/O Specifications: I/O & Speed: Program I/O | Digital I/O Specifications: I/O & Speed: Interrupt Driven | Digital I/O Specifications: I/O & Speed: DMA Mode | Digital I/O Specifications: Transfer Modes: Bidirectional | Digital I/O Specifications: Transfer Modes: 16/32-bit Data Transfers | Digital I/O Specifications: Other Features: Output Current Sink, Max. | Digital I/O Specifications: Other Features: Counter/Timer-Controlled I/O | Digital I/O Specifications: Other Features: Other Features (see our website for details) | Counter/Timer Specs: Number of Channels | Counter/Timer Specs: Maximum Frequency | Counter/Timer Specs: Alarm Registers | Counter/Timer Specs: Cascadable 16-bit Counters | Counter/Timer Specs: 24-Hour Time-of-Day Mode | Counter/Timer Specs: Principal Connectors (**M**ale/Female); **BNC**=BNC; **C**=mD Centronics; **D**=D-Sub; **H**=Header; **R**=Robinson-Nugent; **S**=SCSI-II style; **T**=Screw terminals; **V**=VHD Centronics | Opto 22-Compatible Connector | Third-Party Software Support (see list of names below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **#CYREL 16** | $345 | ISA-8 | 157 | 16 | 16 Relays | 33Hz | Y | – | – | – | – | 5A@120VAC 6A@28VDC | – | 500V Isolation SPDT Relays | – | – | – | – | – | 1 x 50H | – | LTN, LV, NT, SM, TP, UDR |
| **#CYREL 32** | $545 | ISA-8 | 157 | 32 | 32 Relays | 33Hz | Y | – | – | – | – | 3A@120VAC 3A@28VDC | – | 500V Isolation SPDT Relays | – | – | – | – | – | 2 x 50H | – | LTN, LV, NT, SM, TP, UDR |
| **#PCL 722A** | $345 | ISA-8 | Call | 144 | 18 x 8 bits | 500kHz | Y | Y | – | Y | – | 96@12mA 48@24mA | – | Designed for Opto22/CY PB24 | – | – | – | – | – | 6 x 50H | Y | D, LTN, LV |
| | | | | | | | | | | | | | | | | | | | | | | |
| **#PCCDIO 24C** | $215 | PCM | Call | 24 | 2 x 8 bits, 2 x 4 bits | 200kHz | Y | Y | – | Y | – | 2.5mA | – | – | 3 | 10MHz | – | Y | – | 50-pin | – | LTN, LV, UDR |
| **#PCCDIO 48** | $215 | PCM | Call | 48 | 4 x 8 bits, 4 x 4 bits | 200kHz | Y | – | – | Y | – | 2.5mA | – | – | – | – | – | – | – | 50-pin | – | D, LTN, LV, UDR |
| **#4CYCTM 10H** | $245 | PC/104 | Call | – | – | – | Y | Y | – | – | – | – | Y | 100ppm XTAL | 10 | 7MHz | – | Y | Y | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#4CYCTM 10HX** | $295 | PC/104 | Call | – | – | – | Y | Y | – | – | – | – | Y | 50ppm XTAL | 10 | 7MHz | – | Y | Y | 1 x 50H | – | D, LTN, LV, NT, SM, UDR |
| **#4CYDI 48** | $95 | PC/104 | Call | 48 | 6 x 8 bits | 200kHz | Y | – | – | Y | – | Inputs Only | – | – | – | – | – | – | – | 1 x 50H | – | LV, UDR |
| **#4CYDIO 48** | $95 | PC/104 | 159 | 48 | 4 x 8 bits, 4 x 4 bits | 200kHz | Y | – | – | Y | – | 2.5mA | – | – | – | – | – | – | – | 1 x 50H | – | D, LTN, LV, SM, UDR |
| **#4CYDIO AC5** | $95 | PC/104 | Call | 24 | 2 x 8 bits, 2 x 4 bits | – | Y | – | – | Y | – | 64mA | – | Easy cabling to Opto/Gordos Racks | – | – | – | – | – | 1 x 50H | Y | LV, UDR |
| **#4CYDO 48H** | $125 | PC/104 | Call | 48 | 6 x 8 bits | 200kHz | Y | – | – | Y | – | 64mA | – | – | – | – | – | – | – | 1 x 50H | – | LV, UDR |
| **#4CYPDISO 8** | $245 | PC/104 | Call | 16 | 8 Mech. Relays, 8 Isolated Inputs | – | Y | – | – | – | – | 5A@120VAC 6A@28VDC | – | 500V Isolation; 5 SPDT, 3 SPST | – | – | – | – | – | 1 x 40H | – | LTN, LV, SM, UDR |
| | | | | | | | | | | | | | | | | | | | | | | |
| **#CM 7050D** | $150 | RS-485 | 144 | 15 | 7 In / 8 Out | 100Hz | Y | – | – | – | – | 30mA | – | 15 Status LEDs | 7 | 100Hz | – | © | – | 20T | – | D, NT |
| **#CM 7053** | $150 | RS-485 | 144 | 16 | 16 Inputs | 100Hz | Y | – | – | – | – | – | – | Dry Contact | 16 | 100Hz | – | © | – | 20T | – | D, NT |
| **#CM 7053D** | $160 | RS-485 | 144 | 16 | 16 Inputs | 100Hz | Y | – | – | – | – | – | – | Dry Contact with 16 Status LEDs | 16 | 100Hz | – | © | – | 20T | – | D, NT |
| **#CM 7041D** | $160 | RS-485 | 144 | 14 | 14 Isolated Inputs Ⓘ | 100Hz | Y | – | – | – | – | – | – | 30VDC Max.; 14 Status LEDs | 14 | 100Hz | – | © | – | 20T | – | D, NT |
| **#CM 7051D** | $195 | RS-485 | 144 | 16 | 16 Isolated Inputs Ⓘ | 100Hz | Y | – | – | – | – | – | – | 50VDC Max. or Dry Cont., Status LEDs | 16 | 100Hz | – | © | – | 26T | – | D, NT |
| **#CM 7058** | $150 | RS-485 | 144 | 8 | 8 Isolated Inputs Ⓙ | 100Hz | Y | – | – | – | – | – | – | ON: 80–250VAC OFF: 0–30VAC | 8 | 100Hz | – | © | – | 20T | – | D, NT |
| **#CM 7043D** | $160 | RS-485 | 144 | 16 | 16 Outputs | 100Hz | Y | – | – | – | – | 100mA | – | 30VDC Max.; 16 Status LEDs | – | – | – | – | – | 20T | – | D, NT |
| **#CM 7042** | $150 | RS-485 | 144 | 13 | 13 Isolated Outputs Ⓘ | 100Hz | Y | – | – | – | – | 100mA | – | 30VDC Max.; for power relays | – | – | – | – | – | 20T | – | D, NT |
| **#CM 7042D** | $160 | RS-485 | 144 | 13 | 13 Isolated Outputs Ⓘ | 100Hz | Y | – | – | – | – | 100mA | – | 30VDC Max.; Status LEDs | – | – | – | – | – | 20T | – | D, NT |
| **#CM 7060D** | $170 | RS-485 | 144 | 8 | 4 Relays Out 4 Isol. Inputs Ⓘ | 100Hz | Y | – | – | – | – | 0.6A@125VAC 2A@30VDC | – | 250VAC/110VDC Max.; Status LEDs | – | – | – | – | – | 20T | – | D, NT |
| **#CM 7067** | $175 | RS-485 | 144 | 7 | 7 Relays out | 100Hz | Y | – | – | – | – | 0.5A@120VAC 1A@24VDC | – | 7 SPST NO; 1500VAC Surge | – | – | – | – | – | 20T | – | D, NT |
| **#CM 7067D** | $195 | RS-485 | 144 | 7 | 7 Relays out | 100Hz | Y | – | – | – | – | 0.5A@120VAC 1A@24VDC | – | 7 SPST Relays with Status LEDs | – | – | – | – | – | 20T | – | D, NT |
| **#CM 4050** | $160 | RS-485 | 146 | 15 | 7 In / 8 Out | 10Hz | Y | – | – | – | – | 30mA | – | – | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4058** | $167 | RS-485 | 146 | 28 | 3 x 8 bits I/O, plus 4 inputs | 10Hz | Y | – | – | Y | – | 40mA | – | – | – | – | – | – | – | 50S+9T | – | DAQ, D, NT |
| **#CM 4058C** | $295 | RS-485 | 146 | 28 | Same as CM 4058 with Term. Panel | 10Hz | Y | – | – | Y | – | 40mA | – | Includes Terminal Panel & Cable | – | – | – | – | – | 50S+9T | – | DAQ, D, NT |
| **#CM 4052** | $160 | RS-485 | 146 | 8 | 8 Inputs | 10Hz | Y | – | – | – | – | – | – | 5000V Isolation protects your PC | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4054** | $160 | RS-485 | 146 | 15 | 15 Inputs | 10Hz | Y | – | – | – | – | – | – | 5000V Isolation protects your PC | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4053** | $160 | RS-485 | 146 | 16 | 16 Inputs | 10Hz | Y | – | – | – | – | – | – | Contact Sensing | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4056** | $160 | RS-485 | 146 | 15 | 15 Outputs | 10Hz | Y | – | – | – | – | 90mA | – | 5000V Isolation protects your PC | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4060** | $160 | RS-485 | 146 | 8 | 4 Relay Outputs, 4 Isolated Inputs | 10Hz | Y | – | – | – | – | 0.6A@125VAC 2A@30VDC | – | Relay Outputs | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4063** | $195 | RS-485 | 146 | 8 | 8 Relay Out | 10Hz | Y | – | – | – | – | 0.5A@125VAC 1A@30VDC | – | Relay Outputs (0.3A@110VAC) | – | – | – | – | – | 20T | – | DAQ, D, NT |
| **#CM 4067** | $195 | RS-485 | 146 | 8 | 8 Relay Out | 10Hz | Y | – | – | – | – | 3A@250VAC 3A@30VDC | – | Relay Outputs | – | – | – | – | – | 20T | – | DAQ, NT |
| **#CM 4080** | $245 | RS-485 | 146 | – | 2 Independent 32-bit counters | 10Hz | Y | – | – | – | – | – | Y | 5000V Isolation Protects your PC | 2 | 100kHz | Y | – | – | 20T | – | DAQ, D, NT |
| **#ADAM 4050** | $165 | RS-485 | 146 | 15 | 7 In / 8 Out | 10Hz | Y | – | – | – | – | 30mA | – | – | – | – | – | – | – | 20T | – | D, LV, NT |
| **#ADAM 4055** | $210 | RS-485 | 146 | 16 | 8 In / 8 Out | 10Hz | Y | – | – | – | – | 200mA | – | 2500V Isolation; Accepts Modbus | – | – | – | – | Y | 26T | – | IT, NT |
| **#ADAM 4052** | $165 | RS-485 | 146 | 8 | 8 Iso. Inputs | 10Hz | Y | – | – | – | – | – | – | 5000V Isolation protects your PC | – | – | – | – | – | 20T | – | LV, NT |
| **#ADAM 4051** | $210 | RS-485 | 146 | 16 | 16 Inputs | 10Hz | Y | – | – | – | – | – | – | 16 LEDs; Accepts Modbus | – | – | – | – | – | 26T | – | IT, NT |
| **#ADAM 4053** | $185 | RS-485 | 146 | 16 | 16 Inputs | 10Hz | Y | – | – | – | – | – | – | Contact Sensing | – | – | – | – | Y | 20T | – | LV, NT |
| **#ADAM 4056S** | $195 | RS-485 | 146 | 12 | 12 Sink-type outputs | 10Hz | Y | – | – | – | – | 200mA | – | 5000V Isolation; 16 LEDs | – | – | – | – | – | 26T | – | IT, NT |
| **#ADAM 4056SO** | $230 | RS-485 | 146 | 12 | 12 Source-type outputs | 10Hz | Y | – | – | – | – | 1A | – | 5000V Isolation; 16 LEDs | – | – | – | – | – | 26T | – | IT, NT |
| **#ADAM 4060** | $200 | RS-485 | 146 | 4 | 4 Relay Out | 10Hz | Y | – | – | – | – | 0.6A@125VAC 2A@30VDC | – | Accepts Modbus | – | – | – | – | Y | 15T | – | D, LV, NT |
| **#ADAM 4068** | $245 | RS-485 | 146 | 8 | 8 Relay Out | 10Hz | Y | – | – | – | – | 0.6A@125VAC 2A@30VDC | – | Accepts Modbus | – | – | – | – | – | 26T | – | IT, NT |
| **#ADAM 4080** | $270 | RS-485 | 146 | – | 2 Independent 32-bit counters | 10Hz | Y | – | – | – | – | – | Y | 2500V Isolation protects your PC | 2 | 50kHz | Y | – | – | 20T | – | D, LV, NT |

© Each input can be used either as a separate 16-bit event counter or as an input. You can create any combination of inputs and counters, but the counters cannot be cascaded. Ⓘ 3750 VRMS optical isolation. Ⓙ 5000 VRMS optical isolation.

**Bus:** **ETH** = Ethernet; **ISA** = ISA 16-bit (AT); **ISA-8** = Use in any ISA slot: 8-bit (XT) or 16-bit (AT); **PCI** = PCI 3.3V & 5V; **PCI (5V)** = PCI 5V; **PCIe** = PCI Express slot; **PCM** = PCMCIA Type II (PC Card); **PC/104** = PC/104 expansion conn; **PXI** = PXI slot; **RS-485** = RS-485 (serial) port; **USB** = USB 1.1 or faster port.

**Third-Party Software Support:** **D**=DASY*Lab*®; **DAQ**=DAQBench™; **LTN**=Notebook®; **IT**=Intellution FIX DMACS; **LV**=LabVIEW®; **NT**=Windows NT; **SM**=Snap-Master®; **TP**=TestPoint®; **UDR**=Universal Driver Library

**Quantity Discounts: 1-4/List 5-9/5% 10-24/10% 25+/Call** **Quantities of a Single Item Per Shipment – Call for Details**



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# Seamless Upgrade to PCI Express Multichannel Digital I/O

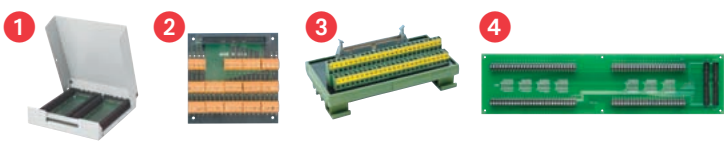
Our **CyDIO 96HE** is a high-density high-drive logic-level digital I/O board that takes advantage of the PCI Express (PCIe) bus. The digital outputs can source 15 mA and sink 64 mA, so additional buffering is usually not required to drive external devices.

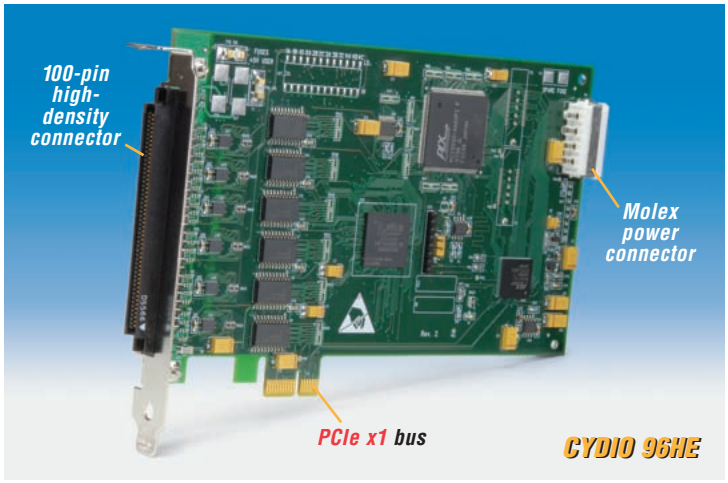
Because the PCIe bus is electronically identical to the PCI bus, the CyDIO 96HE board comes with and uses exactly the same software as the familiar PCI-bus **CyDIO 96HP** (see page 159), namely: the Universal Library, Universal Library for LabView, and other utilities for installation, calibration, and testing.

A new feature of the CyDIO 96HE board is that it includes on-board pull-up/pull-down resistor networks for each port. The default configuration is pull-up, but you can program them for pull-down on a port-by-port basis. These fully programmable networks end the need for fussy SIP installations.

For convenient installation, we offer a complete set of cables and terminal panels. The cables shown in the price box on the right are Y-cables, with a 100-pin connector that mates with the board and two 50-pin connectors that mate with the terminal panels. For more terminal panels and cables, please visit our website; for custom cables, please call our applications engineers.

- Perfect for seamless upgrade from PCI to PCIe
- 96 DIO lines on one 100-pin high-density connector sink 64 mA/line
- Eight 8-bit and eight 4-bit ports, programmable by port
- On-board resistor networks programmable by port for pull-up or pull-down functionality — *no more SIPs to install!*



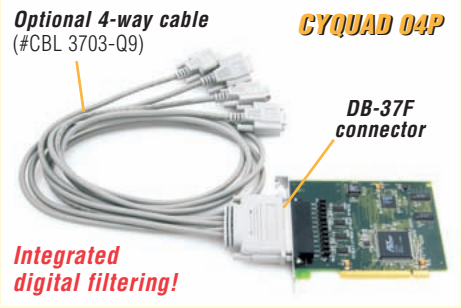




***Ordering Information:*** **Visit cyberresearch.com for detailed specs.**

| | | |
|---|---|---|
| **#CYDIO 96HE** | **PCI Express (PCIe)** 96-ch. I/O Board, high-current (64 mA), 100-pin. | **$395** |
| **#CYDIO 96HP** | **PCI (5V)** 96-channel I/O Board, high-current (64 mA), 100-pin. | **$295** |
| **#CYSTP 502E** | 100-pin Terminal Panel, steel enclosure (2 x 50-pin hdrs.) 1 | **$195** |
| **#CYSTP 50** | Mini Screw Terminal Panel with 50-pin header 2 | **$65** |
| **#TP DIN50** | 50-pin DIN-Mount Terminal Panel 3 | **$89** |
| **#STA 100** | 100-pin Terminal Panel with 2 x 50-pin headers 4 | **$145** |
| **#CBL 10002** | 2-foot, 100-pin Flat-Ribbon Cable to two 50-pin headers | **$49** |
| **#CBL 10005** | 5-foot, 100-pin Flat-Ribbon Cable to two 50-pin headers | **$67** |
| **#CBL 10010** | 10-foot, 100-pin Flat-Ribbon Cable to two 50-pin headers | **$97** |

These boards include our Universal Driver and LabVIEW™ Libraries. Visit our website for a complete list of drivers. See pp. 140~141, 156-157, and 165 for more terminal panels and cables.

## CYQUAD 04P: Inputs and Decoding for 4 Quadrature Encoders




**CYQUAD 04P** PCI-bus boards combine the precision of 24-bit counters with 24-bit preset and 24-bit output latch registers. Integrated digital filtering and 8-bit counter prescalers make actual applications as easy as possible.

The board provides for three basic signals: Phase A, Phase B, and Index, all of them selectable via jumpers for either single-ended or differential input. These signals allow the calculation of position, speed, and direction of rotation on each of the four channels.

The Index signal establishes an absolute reference position within one count of the encoder's 360° rotation. Index signals are often used to reset or preset the position counter, particularly on system startup, when the incremental encoder cannot determine the starting position. The Index signal can also generate an interrupt signal in the computer.

***Ordering Information:*** **Visit cyberresearch.com for detailed specs.**

**PCI 24-bit 4-Channel Quadrature Encoder Board**

| | | |
|---|---|---|
| **#CYQUAD 04P** | **PCI (5V)** 4-ch. Quadrature Encoder Board | **$395** |
| **#CBL 3703-Q9** | Optional Cable, DB-37F to four DB-9F | **$29** |

Incl. Universal Driver and LabVIEW® libraries. See website for complete list of drivers.

## Rugged Industrial Ethernet DIO: 6 Inputs, 6 Relays, & 6 32-bit Counter-Timers

Now you can control remote real-life industrial equipment via Ethernet or over the internet using our **IPDIO 7060** DIO module. Each module has a built-in web server with its own IP address, so you can log in and monitor or control the module from anywhere in the world. For security, an account and pass-word are required when logging in. An IP address filter is also included, so you can allow or deny remote connections from specific IP addresses.

Intended for industrial monitoring and control applications, the IPDIO 7060 can be powered from an unregulated 10~30VDC source, operates from –13 to +167°F, and offers two-way isolation against electrical noise and surge signals. Relays support loads of 5A @ 250VAC or 30VDC. The 23 screw terminals are detachable, for quick and easy connection.

***Ordering Information:*** **See page 150 for detailed specifications.**

| | | |
|---|---|---|
| **#IPDIO 7060** | **Ethernet** DIO Module, 6 isol. in, 6 SPST relays, 6 C/T. | **$275** |
| **#CBL C6P-050GY** | 50-foot Cat-6 Patch Cable, RJ-45 connectors | **$30** |
| **#CBL C6P-100GY** | 100-foot Cat-6 Patch Cable, RJ-45 connectors | **$50** |

Please visit our website for additional Cat-5 & Cat-6 cables.

# Slim-Line SSRs Offer Higher Speeds & More Power!

**WR OAC5AL**

***24~280 VAC, 3 A output; only 1 mA leakage current!***

**WR OAC5AF**

***24~280 VAC, 3 A output; switches in 50 µs maximum!***

**WR OAC5V**

***24~480 VAC, 5A output maximum power capacity***

**WR IDC5BF**

***3.3~32VDC input; only 30/60 ms on/off time!***

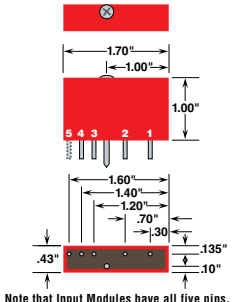
## How Output and Input Modules Work

In one sense, output and input modules are the reverse of each other. **Output** modules use a small input voltage and current (typically 5 to 24V and 10 to 30mA) to open or close an output circuit rated at hundreds of volts and 1 to 5A. **Input** modules sense voltages up to 280V and send logic-level signals back to an interface card in your computer. Together, they allow your PC to both sense the state of motors and actuators and to turn them on or off as necessary.

## Classic Solid-State Relays from Opto 22®

Our "CY" line of modules and mounting boards features only genuine **Opto 22** products, the leader in the field, and the name that is synonymous with solid-state relays. Mounting panels feature status LEDs and an individual 5-amp or 4-amp fuse on each channel to prevent short circuits. CY series modules are perfect for our CY PB, CySSR, and other Opto 22-compatible I/O module mounting panels.

## Slim-Line Modules – Smaller Size, Less Money




Note that Input Modules have all five pins, while Output Modules have only four.

Many of our customers choose genuine "CY" Opto 22 modules. Others prefer our "WR" series of slim-line modules because:

1. They have a smaller case size, but a pin configuration identical to Opto 22 modules. Therefore, slim-line modules take up less room *and* fit in a greater variety of mounting panels — both full-size panels (such as our **CySSR 24**, pg. 156) and panels designed for slim-line modules (including our **WR PBx** models).

2. They cost less and sometimes offer faster speeds and higher ratings.

**QUANTITY DISCOUNTS: 1-4/LIST 5-9/5% 10-24/10% 25+/CALL**

**Quantities of a single item per shipment. Call for details.**

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

### Slim-Line Power Control (Output) Solid-State Relay Modules

| | | |
|---|---|---|
| #WR OAC5 | 12~140 VAC, 3A Power Switch (SSR) Module | $11 |
| #WR OAC5A | 24~280 VAC, 3A Power Switch (SSR) Module | $12 |
| #WR OAC5AL | 24~280 VAC, 3A Power Switch (SSR) Module, 1mA leakage | $12 |
| #WR OAC5AF | High-Speed 24~280 VAC, 3A Power Switch (SSR) Module | $14 |
| #WR OAC5V | 24~480 VAC, 5A Power Switch (SSR) Module | $20 |
| #WR ODC5 | 3~60 VDC, 3A Power Switch (SSR) Module | $11 |
| #WR ODC5A | 5~200 VDC, 1A Power Switch (SSR) Module | $12 |
| #WR ODC5R | 0~110 VDC/125 VAC, 1A (30W DC, 62.5VA) Mech. Relay Module | $16 |
| #WR OD5SM | 3~60 VDC Output Test Module } 3-way switch forces output to be on, off, or determined by logic side | $21 |
| #WR OA5SM | 12~140 VAC Output Test Module } 3-way switch forces output to be on, off, or determined by logic side | $21 |
| #WR ODC5RC | Normally-Closed version of **WR ODC5R** Mechanical Relay Module | $16 |

### Slim-Line Power Sensing (Input) Modules

| | | |
|---|---|---|
| #WR IAC5 | 90~140 VAC or VDC Power Sensing Module | $11 |
| #WR IAC5A | 180~280 VAC or VDC Power Sensing Module | $12 |
| #WR IDC5 | 10~60 VAC or VDC Power Sensing Module | $11 |
| #WR IDC5B | 3.3~32 VDC Power Sensing Module | $11 |
| #WR IDC5BF | High-Speed 3.3~32 VDC Power Sensing Module | $16 |

### Power Control (Output) Solid-State Relay Modules

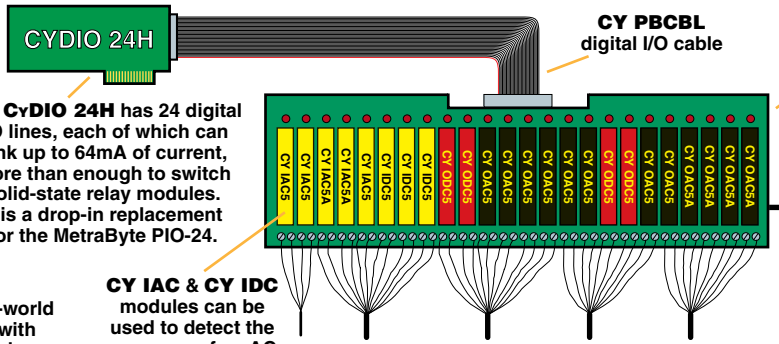
| | | |
|---|---|---|
| #CY OAC5 | 90~140 VAC, 3A Power Switch (SSR) Module | $25 |
| #CY OAC5A | 24~280 VAC, 3A Power Switch (SSR) Module | $25 |
| #CY OAC5A5 | 24~280 VAC, 3A Power Switch Module (Normally Closed) | $25 |
| #CY ODC5 | 5~60 VDC, 3A Power Switch (SSR) Module | $25 |
| #CY ODC5A | 5~200 VDC, 1A Power Switch (SSR) Module | $32 |
| #CY ODC5R | 0~100 VDC/0~130 VAC, 0.5A "Dry Contact" SPST Mech. Relay | $29 |
| #CY OTSM | Output Test Module: Dummy load on logic side; manual switch for testing field wiring | $39 |

### Power Sensing (Input) Modules

| | | |
|---|---|---|
| #CY IAC5 | 90~140 VAC or VDC Power Sensing Module | $25 |
| #CY IAC5A | 180~280 VAC or VDC Power Sensing Module | $25 |
| #CY IDC5G | 35~60 VAC or VDC Power Sensing Module | $25 |
| #CY IDC5 | 10~32 VDC/12~32 VAC Power Sensing Module | $25 |
| #CY IDC5B | 4~16 VDC Power Sensing Module | $25 |
| #CY IDC5D | 2.5~28 VDC Power Sensing Module | $25 |
| #CY ITSM | Input Test Module: Manual switch simulates on/off on logic side; field side not connected | $39 |

# Using the CyDIO 24H to Control Solid-State Relays

Your PC system can be used to control real-world devices or sense the presence of voltage with solid-state relays and power sensing modules.




The **CyDIO 24H** has 24 digital I/O lines, each of which can sink up to 64mA of current, more than enough to switch solid-state relay modules. It is a drop-in replacement for the MetraByte PIO-24.

The **CY PB24** mounting panel can hold up to 24 individual solid-state power relays and/or power sensing modules in any combination.

An **INST 1140** (or other) +5VDC power supply is required to supply control voltage to the modules, as almost all DIO boards are designed to absorb (sink) current, not supply (source) it.

**CY IAC** & **CY IDC** modules can be used to detect the presence of an AC or DC voltage.

The **CY OAC** & **CY ODC** solid-state relay modules can each control power loads of up to 3 Amps.

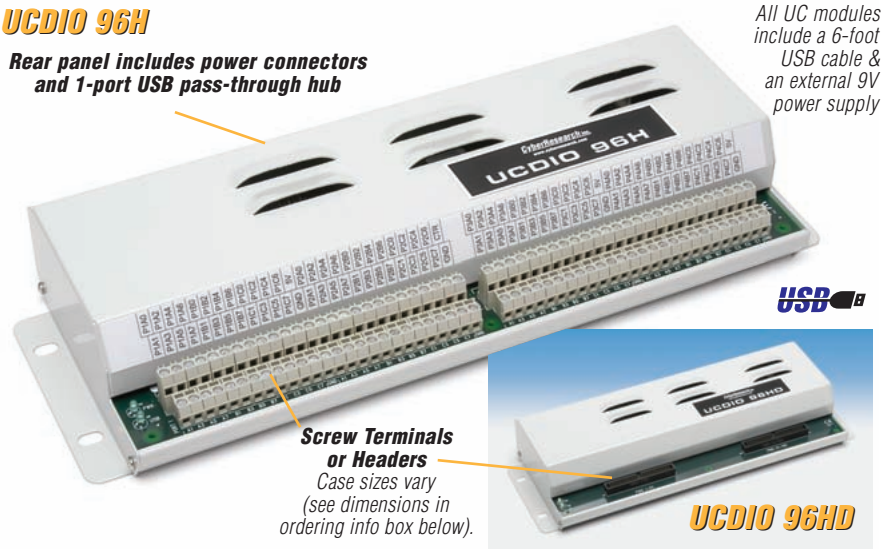

Toll-Free Assistance: 1-800-341-2525 (USA) Tel: 203-643-5000 Fax: 203-643-5001
Applications Engineers: Monday – Friday, 9:00 AM – 5:00 PM, U.S. Eastern Time • e-mail: info@cyberresearch.com

# Remote USB DIO for Fast & Easy Sensing and Control

## UCDIO 96H

**Rear panel includes power connectors and 1-port USB pass-through hub**

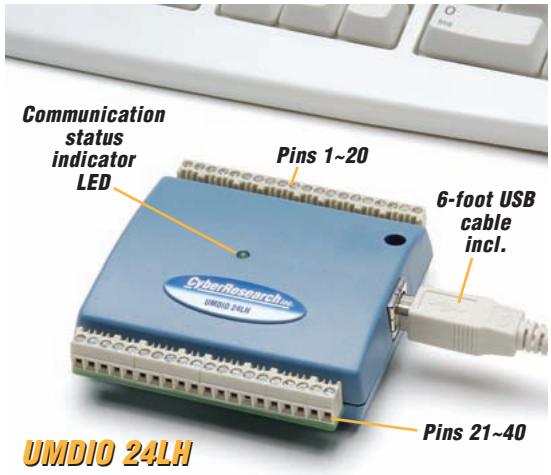
*All UC modules include a 6-foot USB cable & an external 9V power supply*




**Screw Terminals or Headers**
*Case sizes vary (see dimensions in ordering info box below).*




UCDIO 96HD




## UMDIO 24LH

**UMDIO modules go anywhere: in the lab or in the field!**
*All UMDIO series modules measure only 3.1"L x 3.2"W x 1"H and are powered 100% by the host PC's USB port!*

## UM & UC Series DIO Modules Simplify Wiring, Installation, Control, and Programming

Our USB digital I/O modules are divided into two series: ultracompact **UM** series modules are generally intended for relatively light-duty applications. **UC** series modules are better for more intensive input/output, power sensing, and power control applications. All modules are fully compatible with both USB 1.1 and USB 2.0.

Inputs, outputs, counters, and relays are connected with simple screw terminals or headers, so almost any terminal panel is compatible with these modules.

UMCTM 10

Most of the models on this page are rated for operating temperatures from 32° to 158°F (UMCTMs are rated for 32°~140°F). UM models are powered entirely from the USB cable, but UC models include a 9V power supply. Detailed specifications for all modules shown here can be found on our website. Analog-input members of the UC and UM families are described on pg. 134; for solid-state relays that fit our UCSSR series models, please see page 154. For detailed specifications, please visit our website.

***Ordering Information:*** **Additional specifications can be found on page 150.** **Visit cyberresearch.com for detailed information.**

**#UMDIO 24L** **USB** 24-bit DIO Compact Module (2 x 8-bit and 2 x 4-bit ports), with one 32-bit Counter/Timer; 40 screw terminals ..... **$95**
Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC; Voh = 3~5 VDC; Vol = 0~0.4 VDC; IOUT = 2.5 mA max. (source or sink); *Max. Counter Speed:* 1 MHz; 3.2"W x 1"H x 3.1"L

**#UMDIO 24LH** **USB** 24-bit DIO Compact Module (2 x 8-bit and 2 x 4-bit ports), with one 32-bit Counter/Timer; 40 screw terminals ..... **$185**
Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC; Voh = 2.4~5 VDC; Vol = 0~0.55 VDC; IOUT = 64 mA max. (sink) or –40 mA (source); *Max. Counter Speed:* 1 MHz; 3.2"W x 1"H x 3.1"L

**#UMCTM 05** **USB** Five 16-bit TTL-Compatible UP/Down Counters with 16 DIO (8 in, 8 out) and one Interrupt Input..... **$245**
Internal 12 MHz Crystal Oscillator (±50 ppm), *Max. Input Clock Speed:* 20 MHz; up to 5 counters cascadable, DIO sinks 24 mA, Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC;

**#UMCTM 10** **USB** Ten 16-bit TTL-Compatible UP/Down Counters with 16 DIO (8 in, 8 out) and one Interrupt Input ..... **$345**
Internal 12 MHz Crystal Oscillator (±50 ppm), *Max. Input Clock Speed:* 20 MHz; up to 5 counters cascadable, DIO sinks 24 mA, Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC;

**#UMQUAD 08** **USB** Eight Channels of Quadrature (Encoder) Input or Counter Input, 8 protected DIO (individual); 80 screw terminals, two DB-37M..... **$595**
Eight single-ended or differential counter inputs; 10MHz Counters; +/-12V input range; 8 DIO lines (inputs to 50VDC w/de-bounce) 18.9"W x 2.3"H x 4.9"D

**#UCDIO 96HD** **USB** 96-bit DIO Module (8 x 8-bit and 8 x 4-bit ports), sink, with one 32-bit Counter/Timer; 2 x 50-pin headers ..... **$295**
Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC; Voh = 2~5 VDC; Vol = 0~0.5VDC; IOUT = 64 mA max. (sink) or –24 mA (source); *Max. Counter Speed:* 1 MHz; 12.2"W x 2.2"H x 4.9"D

**#UCDIO 96H** **USB** 96-bit DIO Module (8 x 8-bit and 8 x 4-bit ports), with one 32-bit Counter/Timer; 104 screw terminals ..... **$395**
Vih = 2~5.5 VDC; ViL = -0.5~+0.8 VDC; Voh = 2~5 VDC; Vol = 0~0.5VDC; IOUT = 64 mA max. (sink) or –24 mA (source); *Max. Counter Speed:* 1 MHz; 13.5"W x 2.4"H x 5.0"D

**#UCPDISO 8** **USB** 16-bit DIO Module, 8 Isolated Inputs, 8 SPDT Relay Outputs; 40 screw terminals, external 9 V–1 A power supply included..... **$295**
Vih = ±5 VDC; ViL = ±1.5 VDC; Relay contacts rated for 6 A @240 VAC or 28 VDC; NO, NC, and Common available @ terminals; 12.5"W x 1.7"H x 5.1"D

**#UCPDISO 8HD** **USB** 16-bit DIO Module, 8 Isolated Inputs, 8 SPDT Relay Outputs; 40-pin Header, external 9 V–1 A power supply included ..... **$295**
Vih = ±5 VDC; ViL = ±1.5 VDC; Relay contacts rated for 6 A @240 VAC or 28 VDC; NO, NC, and Common available @ connector; 12.4"W x 1.7"H x 5.1"D

**#UCSSR 08** **USB** 8-Position Solid-State Relay Mounting Panel (2 x 4-bit input/output ports); 16 screw terminals ..... **$345**
Voltage and current ratings depend on the relays (pg. 154) you install on the board. *Do not mix input and output relays in a single bank of 4.* 9.5"W x 6.2"H x 5.0"D

**#UCSSR 24** **USB** 24-Position Solid-State Relay Mounting Panel (2 x 8 and 2 x 4-bit input/output ports); 48 screw terminals ..... **$395**
Voltage and current ratings depend on the relays (pg. 178) you install on the board. *Do not mix input and output relays in a single bank.* 18.9"W x 2.3"H x 4.9"D

**#UCERB 08** **USB** Panel with 8 SPDT (Form C) Output Relays, 6A @ 240/120VAC or 28VDC; 24 screw terminals ..... **$245**
2 x 4 relays, configurable for normal or invert logic and for energized or de-energized at power-up; NO, NC, & Common available @ terminals; 8.4"W x 1.7"H x 5.1"D

**#UCERB 24** **USB** Panel with 24 SPDT (Form C) Relays, 6A @ 240/120VAC or 28VDC; 72 screw terminals ..... **$345**
2 x 8 & 2 x 4 relays, config. for normal or invert logic & for energized or de-energized at power-up; NO, NC, & Common available @ connector, 18.9"W x 2.3"H x 4.9"D

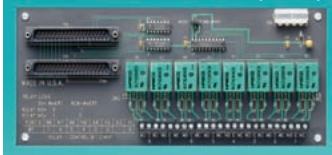
All modules on this page include our Universal Driver and LabVIEW™ Libraries. For a complete list of drivers, please visit our website.
For 20- and 40-pin terminal panels and cables, see pp. 138 and 165. See pg. 154 for solid-state relays for UCSSR modules. For USB cables, see our website.

# Relay Mounting Panels Interface I/O to Power

## Electromechanical Relays: Ideal Companion for Digital I/O

Electromechanical relays have several advantages over solid-state relays. They are usually *less expensive;* they are *more flexible* because they require less current sink from the digital I/O board; and they're *smaller,* so they can be packaged to take up less space. Relays have their drawbacks, however. They can arc or surge when used with devices carrying an inductive load (such as motors), and they don't offer the same optical isolation. ***Important:*** *When using CyERB for switching inductive loads, use the newer* ***CyDO*** *output only boards (pg. 151) which cannot be reset by the "inductive kick."*

**CyERB 08** 8 SPDT (form C) electromechanical relay panel



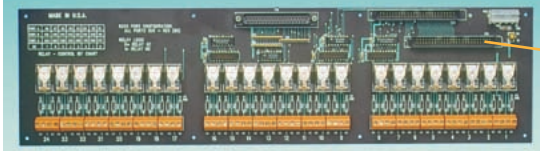
DB-37 connector plus an additional DB-37 connector for pass-through (daisy-chaining) to other accessories

**CyERB Series:** *8, 24, or 48 SPDT relays rated to 28VDC@6A, 120VAC@5A (50~1000Hz)*

Operate Time: 20msec.
Release Time: 10msec.

9" x 4" panel — #CBL MOL10 *not required* — Screw Terminals for 12~22 AWG Wire

**CyERB 24** 24 SPDT (form C) electromech. relay panel

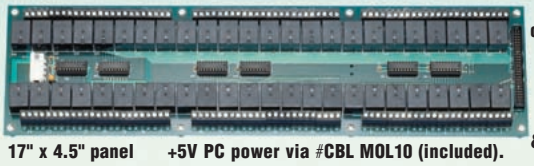


Use either the DB-37 or the 50-pin header connector.

A second 50-pin header passes the other 24 lines of a 48-channel cable to a second CyERB 24.

17" x 4.5" panel — Pulls +5V power from PC via #CBL MOL10 cable (included).

**CyERB 48** 48 SPDT (form C) electromechanical relay panel



50-pin header connector interfaces easily with 48-line, 50-pin I/O boards, including:
CyDIO 48, 96, & 192
& CyDO 48, 96, & 192

17" x 4.5" panel — +5V PC power via #CBL MOL10 (included).

Our **CyERB 08, 24,** & **48** panels are built around 8, 24, or 48 mechanical relays. All of the relays are SPDT/form C, with 3 posts. The three posts on each form C relay are: common (COM), a post attached to a moving pole, & two switching posts, normally-open (NO), and normally-closed (NC). The NC post is in contact with COM at power-up, after reset, or when a "0" is written to the control bit. The NO post is in contact with COM when a "1" is written to the control bit. *Note: "**S**" models include heavier-duty 10A relays which are socketed for quick field replacement.* Model **CyERB 24SF** has built-in circuitry to detect and report back each relay's actual output status (requires a total of 48 I/O lines). Our "**L**" models have lift-off screw terminal strips for fast panel swap-out without rewiring.

Digital I/O lines to the CyERB are pulled to a steady state by circuitry on the board so they do not randomly open or close on power-up. CyERB 08 models use +5V power (through the I/O cable); others need +5V to be supplied (a 10-foot cable to draw +5V from your PC's power supply is supplied with each CyERB 24/48).

On-board buffer/drivers allow the CyERB 24 to be controlled by any LSTTL or NMOS/CMOS device. Compensating for the lack of current sink in such low-power devices, it makes an ideal companion for 8255-type devices, such as the auxiliary I/O on the **CyDAS 1600**.

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#CYERB 08** | Panel with 8 SPDT (Form C) 5A relays, 37-pin (ERA-01) | $115 |
| **#CYERB 24** | Panel w/ 24 SPDT (Form C) 5A relays, 37 & 50-pin (ERB-24) | $245 |
| **#CYERB 48** | Panel w/ 48 SPDT (Form C) 5A relays, 50-pin connector | $345 |
| **#CYERB 08L** | CYERB 08 Panel with removable terminal strips *(min. 5 pcs.)* | $145 |
| **#CYERB 24L** | CYERB 24 Panel with removable terminal strips *(min. 5 pcs.)* | $325 |
| **#CYERB 48L** | CYERB 48 Panel with removable terminal strips *(min. 5 pcs.)* | $495 |
| **#CYERB 08S** | CYERB 08 Panel with 10A socketed relays | $145 |
| **#CYERB 48S** | CYERB 48 Panel with 10A socketed relays | $445 |
| **#CYERB 08SL** | CYERB 08S Panel with removable terminal strips *(min. 5 pcs.)* | $175 |
| **#CYERB 48SL** | CYERB 48S Panel with removable terminal strips *(min. 5 pcs.)* | $595 |
| **#CYERB 24SF** | CYERB 24, 10A socketed, output fault detection (50-pin/48 DIO) | $295 |
| **#CYERB 24SFL** | CYERB 24SF Panel w/removable terminal strips *(min. 5 pcs.)* | $375 |

USB versions now available — see pg. 155! See pg. 140 for 37- & 50-pin cables.

## Use Opto 22 Relays with TTL-level Digital I/O Lines!

A solid-state relay requires more current to switch on than most Intel 8255-based (TTL-level) digital I/O boards can provide. Output buffer chips built onto our **CySSR 08** and **24** relay mounting racks provide 16mA of current sink per channel. By providing the current sink on the relay panel, we've made it possible to use solid-state relays with virtually any TTL-level digital I/O board, regardless of whether or not your digital I/O board provides a sufficiently high current sink.

The **CySSR 08** & **24** mounting racks can use standard or mini-size Opto 22-style solid-state relays. Each of the 8 or 24 positions can be used to mount a solid-state power control module. Mix and match the input (sensing) and output (relay) modules in 4 or 8-module groups, just as you would when mounting them on our standard **CY PB24** panel (see p. 154 for modules; see web for panels).

Multiple CySSR 24 panels can be daisy-chained with 50-pin #CBL 5002

### Daisy-Chain for Large Point Counts

The **CySSR 08** has two 37-pin connectors in parallel, and is wired to port C of your DIO board. Our **CySSR 24** has both 37-pin *and* 50-pin connectors for easy cabling to most I/O boards. Use the two 50-pin connectors, "IN" and "OUT," to daisy-chain a second **24** panel.

+5VDC power for the rack can be supplied by your PC's power supply (via the included 10-foot cable with Molex connector **#CBL MOL10**, pg. 140) or by an external supply, such as our **#MPS 05-01P**.

**CySSR 08** Mounting Rack: Holds 8 Solid-State Relays (Opto 22/Gordos)

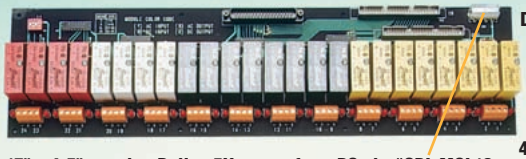
DB-37 (37-pin) connector plus additional DB-37 connector for pass-through

CySSR 08 & CySSR 24 Mounting Rack for use with Opto 22 and equivalent Solid-State Relays.

Screw terminals for 12~22 AWG wire

9" x 4" panel — Indicator LEDs for each relay

**CySSR 24** Mounting Rack: holds 24 solid-state relays (Opto 22/Gordos)



Use either the DB-37 or the 50-pin header connector

A second 50-pin header passes the other 24 lines of a CyDIO 48-channel cable to a second CySSR 24

17" x 4.5" panel — Pulls +5V power from PC via #CBL MOL10

***Ordering Information:*** **Visit cyberresearch.com for more information.**

| | | |
|---|---|---|
| **#CYSSR 08** | 8-Position TTL-Level Relay Mtg. Panel, 37-pin (SRA-01) | $95 |
| **#CYSSR 24** | 24-Position TTL Relay Mtg. Panel, 37 & 50-pin (SSIO-24) | $175 |
| **#CYSSR 08L** | CYSSR 08 w/ removable terminal strips *(min. 5 pcs.)* | $115 |
| **#CYSSR 24L** | CYSSR 24 w/ removable terminal strips *(min. 5 pcs.)* | $225 |
| **#MPS 05-01P** | 5V, 1A Power Supply (plugs into 120V outlet) | $39 |
| **#CBL 3702** | 2-foot, 37-pin flat ribbon cable (page 140) | $25 |
| **#CBL 5002** | 2-foot, 50-pin flat ribbon cable (page 140) | $25 |
| **#CBL 5006** | 6-foot, 50-pin flat ribbon cable (page 140) | $35 |

USB versions – see pg. 155! Panels do not include Solid-State Power Modules (see pg. 154).

# Monitor & Control High-Voltage AC or DC from Your PC!

## CyDUAL AC5P Dual Opto/Gordos AC5/PB Relay Rack Digital I/O Board

One 100-pin Robinson-Nugent connector

Opto/Gordos AC5-compatible.

Cable compatible with PB8, 16, & 24

**IMPORTANT:** Cables to connect CyDUAL AC5/AC5P's connector(s) & the CY PB24 panel's card-edge connector:
ISA: use CY PBC24
PCI: use CBL 100050E

### Opto-22 Compatibility: CyDUAL AC5 Solid-State Relay Driver

If you are designing a system around CY PB24 solid-state relay racks (see web) and want a reasonably-priced, high quality solid-state relay driver board, choose the **CyDUAL AC5** (ISA bus) or **CyDUAL AC5P** (PCI bus). These cards control up to 48 devices and include such features as:

- Electrical and pinout compatibility with OPTO/Gordos AC5.
- 48 high-drive digital I/O lines (64mA) designed to drive solid-state relays, electromechanical relays, and LEDs directly.
- Connectors pin-to-pin compatible with Opto-22 PB racks; use CBL 10005E cable with PCI model, or CY PBC24 with ISA model.
- Directly control two PB24 solid-state relay racks.
- Easy to program using 8255 Mode 0 Control register or AC5 software. Unlike the OPTO/Gordos AC5, the CyDUAL AC5 must be programmed port-by-port as input or output (card has four 8-bit & four 4-bit ports). I/O direction is not bit-programmable.

See pg. 154 & our website for information on solid-state relays, solid-state relay mounting panels, and related accessories.

## CyREL 8/16/32 8, 16, or 32 Electromechanical form C SPDT relays

CyREL 16: Just 8.8" long.

50-pin header connector perfect for ribbon cable

Choose 8 or 16 SPDT form C relays rated to 5A@120VAC, 6A@28VDC w/resistive load. 32-relay model is full-length, with relays rated 3A @ 120VAC. Relay contacts: gold overlay silver

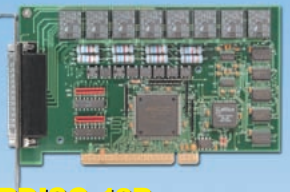
### 8, 16, or 32 Electromechanical Relays on a PC Card

These relay boards save you the cost of buying a digital I/O controller and then needing a separate terminal panel with mechanical or solid-state relays. The **CyREL 8, 16,** & **32** have both the controller and 8, 16, or 32 relays built directly onto the board to provide you with a complete, all-in-one package.

All of the relays are full SPDT Form C. The contacts are rated 5A@120VAC or 6A@28VDC with resistive load (3A@120VAC or 3A@28VDC on CyREL 32). Each channel offers 500VDC isolation between I/O connections and your PC. Operate time: 20ms; release time: 10ms; contact life: 100 million operations.

Controlling the relays is easy. Each 8 relays are addressed as an 8-bit port. An 8-bit byte is written to the output port. Each of the 8 bits per individual byte controls the on/off status of one relay. Writing a "0" to a bit deactivates that relay, while writing a "1" to a bit activates the relay. Drivers are not supplied with our CyREL boards, as programming is as simple and direct as it can get — just use the I/O statements included in virtually all programming languages.

## CyPDISO 8P 8 Mechanical relays & 8 isolated inputs (500V max.)

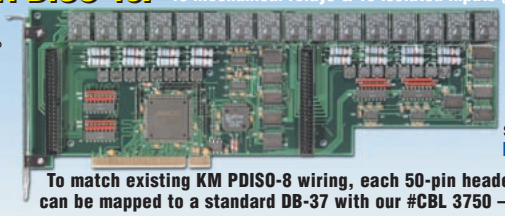


Just 7" long.

8 electromechanical relays:
5 form C SPDT relays &
3 form A SPST relays
Rated to 6A @ 28VDC or 120VAC, resistive
Operate time 20ms, Release 10ms

DB-37 connector, same pinout as PDISO-8

## CyPDISO 16P 16 Mechanical relays & 16 isolated inputs (500V max.)



Just 12.33" long.

Two 50-pin headers with a CyPDISO 8 on each!

Functionally similar to the K/M PIO-32I/O

To match existing KM PDISO-8 wiring, each 50-pin header connector can be mapped to a standard DB-37 with our #CBL 3750 – see pg. 140.

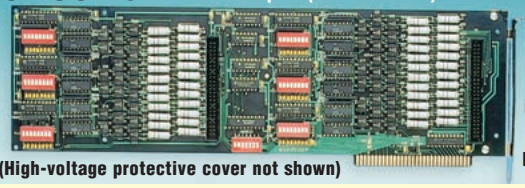
### 8 or 16 Isolated Inputs & 8 or 16 Relays: All on 1 Board!

The **CyPDISO 8** is a low-cost, 8-channel isolated interface board which allows you to directly connect your PC to AC or DC power lines. It's a **drop-in replacement for the PDISO-8 from MetraByte**. Isolation voltage is a minimum of 500V channel-to-channel and channel-to-ground. The CyPDISO 8 has one DB-37 connector which carries 8 isolated inputs. Each isolated input has two contacts which are not polarity sensitive and may be mixed between 5 to 24VDC or VAC (50~1000Hz). Connecting an input is as easy as connecting one side of the contact to pin 1 and the other to pin 2. *Inputs not TTL-compatible.*

Data is written to all 8 relays and read from all 8 inputs as a single byte. Each of the 8 bits per individual byte controls the status of 1 relay or confirms the status of 1 input line. No driver is supplied with the CyPDISO 8; just use the I/O statements included in virtually all programming languages.

The **CyPDISO 16** is two CyPDISO 8s on one card with two 50-pin connectors (each maps to a DB-37 with #CBL 3750 cable).

## CyISO 48 48 Isolated inputs (500V isolation)



(High-voltage protective cover not shown)

Two 50-pin header connectors

Each cable carries 24 isolated inputs

Occupies 6 I/O base addresses

### 48 Isolated Inputs: 5 to 24VDC Inputs, 500V Isolation

The **CyISO 48** is a 48-channel isolated interface board which allows you to directly monitor AC or DC power lines with your PC. Isolation voltage is a minimum of 500V channel-to-channel and channel-to-ground. The CyISO 48 has two 50-pin connectors which each carry 24 isolated inputs. Each input has two contacts (which are not polarity sensitive) that can be mixed between 5 and 24VDC or VAC (50~1000Hz). Inputs are not TTL compatible. Connecting an input is as easy as connecting one side of the contact to pin 1 and the other to pin 2.

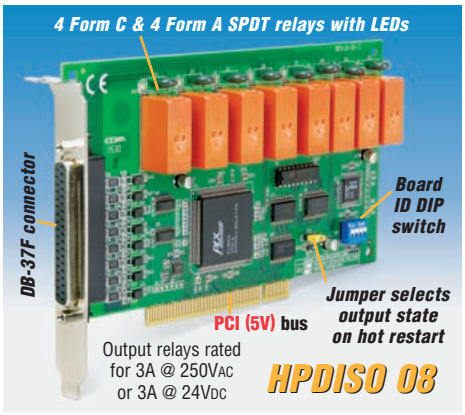
***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

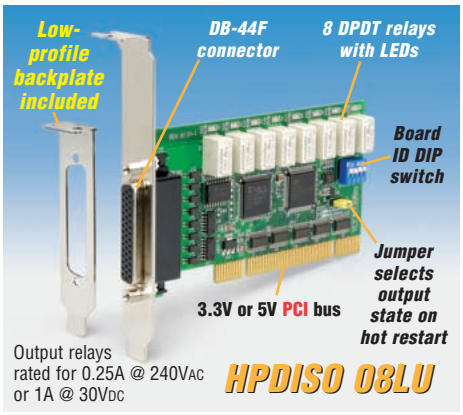
| | |
|---|---|
| #**CYPDISO 8** | **ISA:** 8 Mech. Relays + 8 Isolated Inputs, 37-pin.....$**295** |
| #**CYPDISO 16** | **ISA:** 16 Mech. Relays + 16 Isolated Inputs, 50-pin..$**545** |
| #**CYPDISO 8P** | **PCI (5V)** version of **CyPDISO 8**, 6.8"**L**, 37-pin.....$**295** |
| #**CYPDISO 16P** | **PCI (5V)** version of **CyPDISO 16**, 12.25"**L**, 50-pin ...$**425** |
| #**CYREL 08** | **ISA:** 8 Mechanical Relays (Form C SPDT), 50-pin.....$**245** |
| #**CYREL 16** | **ISA:** 16 Mechanical Relays (Form C SPDT), 50-pin.....$**345** |
| #**CYREL 32** | **ISA:** 32 Mech. Relays (Form C SPDT), two 50-pin .....$**545** |
| #**CYISO 48** | **ISA:** 48 Isolated (500V) Digital Inputs, two 50-pin ..$**725** |
| #**CYDUAL AC5** | **ISA:** 48-bit High-Drive Opto 22 AC5 compat., two 50-pin ..$**245** |
| #**CYDUAL AC5P** | **PCI (5V)** version of **CyDUAL AC5**, 100-pin conn. .....$**195** |
| #**CBL 3750** | Brings 50-pin header on CyPDISO 16 out to DB-37 backplate ..$**25** |
| #**CBL 10005E** | Breaks out 100-pin on CyDUAL AC5P to 2 50-pin edge conns ...$**65** |

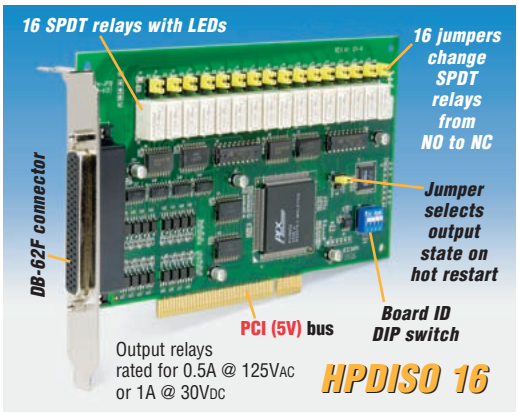
**CAUTION:** Use great care when connecting to high voltages. Protective wiring enclosures recommended. See pages 140 and 156 for terminal panels and cabling options.

# HPDISO Relay Output Boards: Optical Isolation of 2500 or 3750 VDC

## Reset Protection • Temperatures Up to 140°F • On-Board ID Switch


4 Form C & 4 Form A SPDT relays with LEDs
DB-37F connector
Board ID DIP switch
Jumper selects output state on hot restart
PCI (5V) bus
Output relays rated for 3A @ 250VAC or 3A @ 24VDC
HPDISO 08


Low-profile backplate included
DB-44F connector
8 DPDT relays with LEDs
Board ID DIP switch
Jumper selects output state on hot restart
3.3V or 5V PCI bus
Output relays rated for 0.25A @ 240VAC or 1A @ 30VDC
HPDISO 08LU


16 SPDT relays with LEDs
16 jumpers change SPDT relays from NO to NC
DB-62F connector
Jumper selects output state on hot restart
Board ID DIP switch
PCI (5V) bus
Output relays rated for 0.5A @ 125VAC or 1A @ 30VDC
HPDISO 16

Our new **HPDISO** family of relay output digital I/O boards make it easy to control real-world industrial devices directly from your PC. All of them offer wide input ranges, optical isolation, ESD protection, overvoltage protection, and reset protection — just the attributes needed to work successfully in electrically noisy, static-prone shop floors and laboratories.

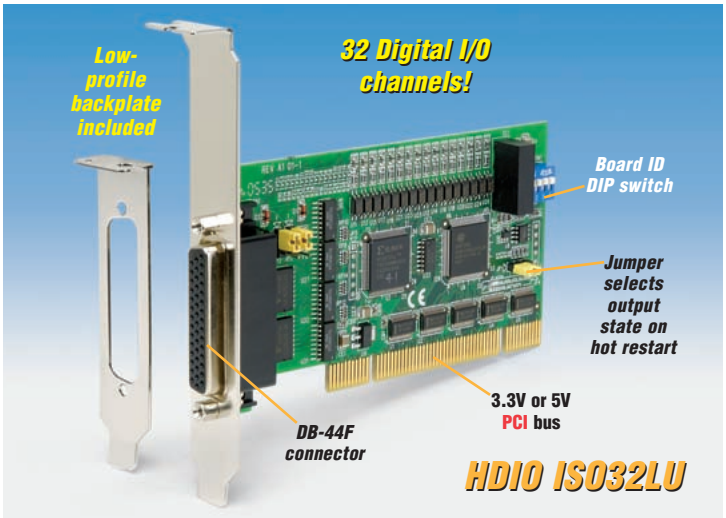
Some typical automation applications include industrial ON/OFF control, switch status sensing, control of semiconductor machinery, actuation and monitoring of test and measurement equipment, and driving external relays.

Detailed specifications for each board are shown in the comparison charts on pp. 150~152 Some common features that are particularly useful in industry include:

- **Wide input ranges:** These boards accept input voltages from 10 to 50 VDC, so they suit applications with 12, 24, or 48 VDC inputs. Input currents can range up to 17.3 mA
- **Robust protection:** All three boards have overvoltage protection up to 70 VDC, and all offer ESD protection up to 2000 VDC. HPDISO 16 and 08LU provide optical isolation to 2500 VDC; HPDISO 08 has optical isolation to 3750 VDC.
- **Reset protection:** Unexpected hot resets, when system power is not turned off, are protected by a jumper on each board. You can choose to retain the output values of each channel or reset all relays to an "open" condition.
- **Individual board ID:** A built-in DIP switch helps identify boards when more than one of the same type is installed.

# Low-Profile HDIO ISO32LU:

## 32 DIO with 2500VDC Isolation




Our **HDIO ISO32LU** PCI digital I/O board offers an unusually low cost per point, yet its high input and output voltage ranges plus 2,500 VDC optical isolation make it rugged enough for both industrial and student applications. It's ideal for industrial ON/OFF control and automation, switch sensing, and BCD interfacing. Outstanding features include:

- 16 inputs, 16 outputs; fixed
- Input high voltage: 5~30 VDC
- Input low voltage: 0~2VDC
- Input current: 1.4~10.3 mA typical
- Output voltage: 5~40VDC
- Output current: 200 mA per channel, source or sink

*For full specifications, see comparison chart on pages 150-152 or visit our website.*

***Ordering Information:*** **Visit cyberresearch.com for detailed info.**

**16 Digital I/O with 8 Isolated Inputs and 8 Relay Outputs:**

**#HPDISO 08** PCI (5V) Full-Size DIO Card (8 in, 8 relays out) .....**$195**
**#HPDISO 08LU** PCI Low-Profile DIO Card (8 in, 8 relays out).....**$275**

**32 Digital I/O with 2,500 VDC Input Isolation and Relay Output:**

**#HPDISO 16** PCI (5V) DIO Full-Size Card (16 in, 16 relays out).....**$275**

**32 Digital I/O with 2,500 VDC Input Isolation and 200 mA/ch. Out:**

**#HDIO ISO32LU** PCI Low-Profile DIO Card (16 in, 16 out) .....**$345**

All boards listed above come with an extensive complement of utilities and drivers
For a complete listing of this software, please visit our website.
For detailed specifications on these cards, see pages 150~152.

**Terminal Panels & Cables HPDISO 08:**

**#TP DIN37F** 37-pin Terminal Panel, DB-37F connector .....**$89**
**#CBL 3703M** 37-pin Round Shielded Cable, DB-37 M-M, 3 feet.....**$29**
**#CBL 3706M** 37-pin Round Shielded Cable, DB-37 M-M, 6 feet.....**$39**
**#CBL 3710M** 37-pin Round Shielded Cable, DB-37 M-M, 10 feet ...**$49**

**Terminal Panels & Cables for HPDISO 16:**

**#TP DIN62F** 62-pin Terminal Panel, DB-62F connector .....**$49**
**#CBL 6203** 62-pin Round Shielded Cable, DB-62 M-M, 3 feet.....**$25**
**#CBL 6210** 62-pin Round Shielded Cable, DB-62 M-M, 6 feet.....**$45**
**#CBL 6216** 62-pin Round Shielded Cable, DB-62 M-M, 10 feet ...**$60**

**Terminal Panels & Cables for HDIO ISO32LU & HDISO 08LU:**

**#TP DIN44F** 44-pin Terminal Panel, DB-44F connector .....**$89**
**#CBL 4403MM** 44-pin Round Shielded Cable, DB-44 M-M, 3 feet.....**$35**

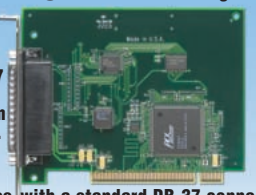
Please visit our website for pictures and additional specifications fort these and other terminal panels and cables.

**QUANTITY DISCOUNTS: 1-4: LIST 5-9: 5% 10-24: 10% 25+: CALL**
**DISCOUNTS APPLY TO QUANTITY OF ANY SINGLE ITEM PER SHIPMENT. CALL FOR DETAILS.**


www.cyberresearch.com
Visit our website for detailed product information!
Toll-Free Assistance: 1-800-341-2525 (USA) Tel: 203-643-5000 Fax: 203-643-5001
Applications Engineers: Monday – Friday, 9:00 AM – 5:00 PM, U.S. Eastern Time • e-mail: info@cyberresearch.com

# Multi-Channel Digital I/O for PCI, ISA, PCMCIA, & PC/104

**CyDIO 24P** Short length card




Mates with a standard DB-37 connector, so it can be used with most MetraByte-compatible accessories.

**CyDIO 24HP** 24 Hi-current I/O

High-current digital I/O can sink up to 64mA current (can source 15mA) per line to light LEDs, switch relays, etc.

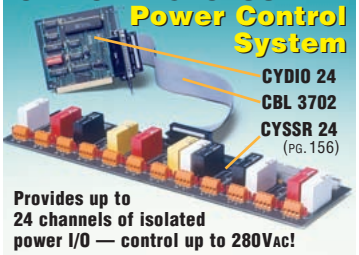
**PCCDIO 24C** 24 TTL Dig. I/O

PCMCIA Digital I/O Card

See our website for more PCMCIA cards

Includes three 16-bit counter/timers, 10MHz clock.

**CyDIO 24 & CySSR 24 Power Control System**




(PG. 156)

Provides up to 24 channels of isolated power I/O — control up to 280VAC!

**CyDIO 48HP** 48 TTL-level I/O lines

50-pin header (ribbon cable) connector carries all 48 digital I/O lines plus power: +5VDC & ground

Half-length Card

**CyDIO 48H/HP**

48 high-current digital I/O lines. Each line can source 15mA or sink 64mA (not pictured).

High-current models emulate an 8255 and are fully compliant with 8255 Mode 0. They provide two 8-bit ports & two 4-bit ports per 24 I/O lines.

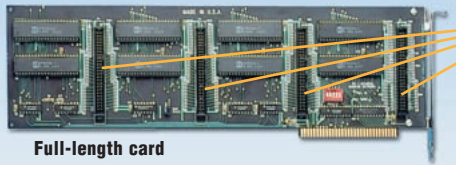
**CyDIO 96HP** 96 TTL-level I/O lines

Mid-length card

100-pin high-density Robinson-Nugent Connector on backplate carries all 96 digital I/O lines plus two +5VDC power and two ground lines

Software-compatible with 8255 digital I/O (PIO-12, 24, & 96)

**CyDIO 192** 192 TTL-level I/O lines



Four 50-pin header connectors

Each connector carries 48 digital I/O lines plus +5VDC power & ground

Full-length card

## Monitor Contact Closures & Control Relays: Our CyDIO Family Offers Boards for ISA, PCI, PCMCIA, & PC/104

With the boards in this section you can monitor and control real-world On/Off-type devices. At CyberResearch, we understand how important digital I/O is to many of our customers, so we've developed our CyDIO family, the broadest selection of digital I/O boards ever!

Our **CyDIO 24** adds 24 easy-to-program digital I/O lines to your PC so you can start controlling relays and sensing contact closures. These boards are quite simple, consisting primarily of an Intel 8255 PPI chip on a PC board. They can be used for byte-wide or 4-bit wide TTL I/O.

Like the CyDIO 24, our **CyDIO 24C** has 24 digital I/O lines, but it adds three 16-bit counters which allow you to measure frequency or count events such as the number of times a door opens or how many items pass by on a conveyor.

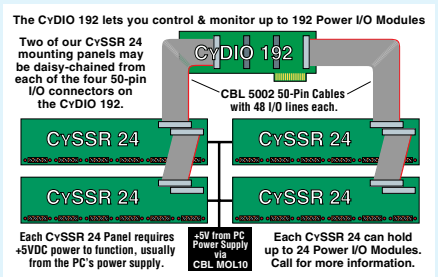
Our **CyDIO 24H & 48H** boards use discrete logic in place of the Intel 8255 to gain a high current sink (64mA) for such applications as switching solid-state relays, lighting LEDs, and numerous other higher current tasks that are beyond the capabilities of simple TTL circuits like the 8255.

With the **CyDIO 48**, **96**, & **CyDIO 192,** you can economically sense and control 48, 96, or 192 digital I/O lines from a single slot in your PC. Our accessory screw terminal and relay panels all interface to the 50-pin I/O connector found on all three boards.

With I/O boards for every popular bus interface, you can accomplish real-world control with almost any PC system. We have boards for PCI, ISA, PCMCIA, & PC/104.

The CyDIO family maintains compatibility with the 8255 in software, thereby simplifying your programming & ensuring compatibility with third-party programs. CyDIO boards are guaranteed to be compatible with their MetraByte™ counterparts (PIO-12, PIO-24 & PIO-96), including hardware and software addressing. The 8255 is simple to program via ordinary IN & OUT statements.

All boards shown on this page include our Universal Driver and LabVIEW™ Libraries (visit our website for full details about these software packages), as well as a complete list of downloadable.drivers.


The CyDIO 192 lets you control & monitor up to 192 Power I/O Modules
Two of our CySSR 24 mounting panels may be daisy-chained from each of the four 50-pin I/O connectors on the CyDIO 192.
CyDIO 192
CBL 5002 50-Pin Cables with 48 I/O lines each.
CySSR 24
CySSR 24
CySSR 24
CySSR 24
Each CySSR 24 Panel requires +5VDC power to function, usually from the PC's power supply.
+5V from PC Power Supply via CBL MO10
Each CySSR 24 can hold up to 24 Power I/O Modules. Call for more information.

## CyDIO Makes it Easy to Interface Your PC System with the Real World!

With our **CyDIO** boards you can turn your PC into an alarm system by sensing contact closures or use it to control lights, locks, motors, heaters, or any number of electronic devices that can be turned on and off. The high-current **H models** are powerful enough to light LEDs and drive solid-state relays. The CyDIO TTL models can sense and control 0~5V logic-level devices. For devices such as motors, you will need to purchase an electro-mechanical relay mounting panel or a buffered solid-state relay mounting panel (CySSR or CyERB; see website). Our **CyDO** boards can sink higher voltages (up to 50V) and up to 500mA current directly, without I/O modules. Our I/O boards are supported by a wide range of accessories — see pages 140~141.

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#CYDIO 24P** | PCI (5V) 24-channel Digital I/O Board, TTL-level, 37-pin | **$105** |
| **#CYDIO 24HP** | PCI (5V) 24-channel I/O Board, high-current (64mA), 37-pin | **$175** |
| **#CYDIO 48HP** | PCI (5V) 48-ch. Digital I/O Board, high-current (64mA), 50-pin | **$235** |
| **#CYDIO 96P** | PCI (5V) 96-channel I/O Board, TTL-level, 100-pin | **$265** |
| **#CYDIO 96HP** | PCI (5V) 96-channel I/O Board, high-current (64mA), 100-pin | **$295** |
| **#CYDIO 24** | ISA 24-channel Digital I/O Board, TTL-level, 37-pin | **$145** |
| **#CYDIO 24H** | ISA 24-ch. Digital I/O Board, high-current (64mA), 37-pin | **$165** |
| **#CYDIO 24C** | ISA 24-ch. Digital I/O Board, TTL, w/three 16-bit counters, 37-pin | **$195** |
| **#CYDIO 48** | ISA 48-channel Digital I/O Board, TTL-level, 50-pin | **$185** |
| **#CYDIO 48H** | ISA 48-channel Digital I/O Board, high-current (64mA), 50-pin | **$245** |
| **#CYDIO 96** | ISA 96-channel Digital I/O Board, TTL-level, 50-pin | **$245** |
| **#CYDIO 192** | ISA 192-channel Digital I/O Board, TTL-level, 50-pin | **$445** |
| **#PCCDIO 24C** | PCMCIA 24-channel I/O Card, TTL, with 3 counters (see website) | **$215** |
| **#PCCDIO 48** | PCMCIA 48-channel I/O Card, TTL-level (see website) | **$215** |
| **#4CYDIO 48** | PC/104 48-channel Digital I/O Module, TTL-level, 50-pin | **$95** |
| **#STA 01** | Screw Terminal Panel w/prototyping area, 37-pin (see pg. 141) | **$95** |
| **#CYSTP 37** | Mini Screw Terminal Panel, 37-pin (see pg. 141) | **$65** |
| **#CYSTP 50** | Mini Screw Terminal Panel, 50-pin (see pg. 141 or 165) | **$65** |
| **#STA 100** | 100-line Screw Terminal Panel, two 50-pin headers (pg. 165) | **$145** |
| **#CBL 3702** | 2-foot, 37-pin Flat-Ribbon Cable, DB-37F-F | **$25** |
| **#CBL 3705FS** | 5-foot, 37-pin Round Shielded Cable, DB-37F-F | **$35** |
| **#CBL 5002** | 2-foot, 50-pin Flat-Ribbon F-F Cable, F-F headers | **$25** |
| **#CBL 5006** | 6-foot, 50-pin Flat-Ribbon F-F Cable, F-F headers | **$35** |
| **#CBL 10002** | 2-foot, 100-pin Flat-Ribbon Cable to two 50-pin headers | **$49** |

All boards and cards listed above include our Universal Driver and LabVIEW™ Libraries. For a list of drivers visit our website. See pp. 140~141, 154, 156, and 165 for terminal panels and cables.

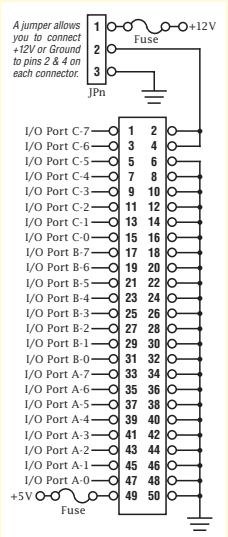
# Opto 22® Compatible High-Density Digital I/O Boards — Use Straight-Through Cables!

**PCIDIO 96H: 96 I/O Lines, 24mA Sink**

**PCIDIO 24H & 48H: 24 or 48 I/O Lines**

Our **PCIDIO 24H**, **48H**, and **96H** are high-density parallel digital I/O boards with 24, 48, & 96 channels, respectively. Each of the 50-pin header connectors on these boards is fully compatible with industry-standard Opto 22 I/O module mounting racks, such as our **CY PB24** (see website). Each connector has pins for +5V power, with jumper-selectable +12V power (see diagram at right). These cards are completely plug-&-play, requiring little if any configuration.

- **Parallel Digital I/O:** On-board circuits emulate 8255 PPI chips; each connector carries 24 digital I/O lines, and can sink 24mA of current on each channel.
- **Programmable Counter/Timer:** An 82C54 chip includes three 16-bit counter/timers; one acts as an event counter, the remaining two cascade together to form a single 32-bit counter that can control interrupt generation.
- **Dual Interrupt Sources:** To allow for added versatility when used in industrial applications, these boards can accept two different interrupt sources: one from the I/O port or event counter, the other from the I/O port or timer chip. Interrupts can be disabled via software for plug-and-play.




Note: pin assignments of all connectors are identical.

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#PCIDIO 24H** | PCI (5V) 24-channel Digital I/O Card, 24mA/Channel Sink | **$120** |
| **#PCIDIO 48H** | PCI (5V) 48-channel Digital I/O Card, 24mA/Channel Sink | **$225** |
| **#PCIDIO 96H** | PCI (5V) 96-channel Digital I/O Card, 24mA/Channel Sink | **$375** |

**PCICTM 12: 12 Counter/Timers**

## PCICTM 12: 12-Channel Counter/Timer and Digital I/O Card

Our **PCICTM 12** is a half-length, PCI-based general purpose counter/timer and digital I/O card. It has four 8254 counter/timer chips on board, providing twelve 16-bit down counters or dividers (binary or BCD). Unlike many older counter cards, the PCICTM 12 provides user access on the connector to the External Clock Input, Gate, and Output signal lines of all twelve counter/timer circuits.

The PCICTM 12 is capable of a variety of different configurations that provide it with the versatility to match a wide range of industrial and laboratory applications (event counter, frequency generator/synthesizer, pulse width generator, etc.). Two counters can be set as independent or cascaded (based on an 8MHz clock) and the gate control for the counters can be an internal or external clock source.

The PCICTM 12 allows for two interrupt sources, one of which originates from the output of counter #12. The other interrupt signal can originate from an external source. This interrupt signal can be utilized as a watchdog timer or for other applications (maximum interrupt time interval is 536 seconds). When an external clock or external interrupt is used, a programmable debounce function can be enabled or disabled by the user via a jumper setting. The card also provides 8 digital input channels and 8 digital output channels which are TTL compatible and can be used to control and monitor external devices.

Input and output signals are accessed via a DB-100 high-density female 100-pin connector (see pinout diagram at right). The card is fully plug-n-play, eliminating the need for preplanned configuration modifications to your system. For users who write their own programs, the PCICTM 12 is supported by a comprehensive set of drivers and programming tools. For a complete list of currently available drivers, please visit our website. In addition, the PCICTM 12 can be linked to popular packages such as DASY*Lab*® and LabVIEW®. DAQBench provides ActiveX controls for Win98/NT programming (see website for details).

**PCICTM 12**

| | | | |
|---|---|---|---|
| +12V | 1 | 51 | Ground |
| +12V | 2 | 52 | Inverter Out 2 |
| +12V | 3 | 53 | Inverter In 2 |
| +5V | 4 | 54 | Ground |
| +5V | 5 | 55 | Inverter Out 1 |
| +5V | 6 | 56 | Inverter In 1 |
| N/C | 7 | 57 | Interrupt In |
| Digital In 6 | 8 | 58 | Digital In 7 |
| Digital In 4 | 9 | 59 | Digital In 5 |
| Digital In 2 | 10 | 60 | Digital In 3 |
| Digital In Ø | 11 | 61 | Digital In 1 |
| Digital Out 6 | 12 | 62 | Digital Out 7 |
| Digital Out 4 | 13 | 63 | Digital Out 5 |
| Digital Out 2 | 14 | 64 | Digital Out 3 |
| Digital Out Ø | 15 | 65 | Digital Out 1 |
| N/C | 16 | 66 | N/C |
| Ground | 17 | 67 | Counter Out 12 |
| Ground | 18 | 68 | Ground |
| Ground | 19 | 69 | Counter Out 11 |
| Ground | 20 | 70 | Ground |
| Ground | 21 | 71 | Counter Out 10 |
| Ground | 22 | 72 | Gate 10 |
| Ground | 23 | 73 | Ext Clock In 10 |
| Ground | 24 | 74 | Counter Out 9 |
| Ground | 25 | 75 | Gate 9 |
| Ground | 26 | 76 | Ext Clock In 9 |
| Ground | 27 | 77 | Counter Out 8 |
| Ground | 28 | 78 | Gate 8 |
| Ground | 29 | 79 | Ext Clock In 8 |
| Ground | 30 | 80 | Counter Out 7 |
| Ground | 31 | 81 | Gate 7 |
| Ground | 32 | 82 | Ext Clock In 7 |
| Ground | 33 | 83 | Counter Out 6 |
| Ground | 34 | 84 | Gate 6 |
| Ground | 35 | 85 | Ext Clock In 6 |
| Ground | 36 | 86 | Counter Out 5 |
| Ground | 37 | 87 | Gate 5 |
| Ground | 38 | 88 | Ext Clock In 5 |
| Ground | 39 | 89 | Counter Out 4 |
| Ground | 40 | 90 | Gate 4 |
| Ground | 41 | 91 | Ext Clock In 4 |
| Ground | 42 | 92 | Counter Out 3 |
| Ground | 43 | 93 | Gate 3 |
| Ground | 44 | 94 | Ext Clock In 3 |
| Ground | 45 | 95 | Counter Out 2 |
| Ground | 46 | 96 | Gate 2 |
| Ground | 47 | 97 | Ext Clock In 2 |
| Ground | 48 | 98 | Counter Out 1 |
| Ground | 49 | 99 | Gate 1 |
| Ground | 50 | 100 | Ext Clock In 1 |

**QUANTITY DISCOUNTS: 1-4/LIST 5-9/5% 10-24/10% 25+/CALL** Quantities of a Single Item Per Shipment – Call for Details

*Operating Temp.: +32ºF to +140ºF (0ºC to +60ºC). Storage Temp.: –4ºF to +176ºF (–20ºC to 80ºC). Humidity: 5% to 95%, noncond. Dimensions: 6.4"L x 4.3"H (163 x 108mm). See page 165 for cabling.*

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#PCICTM 12** | PCI (5V) 12-channel Counter/Timer and Digital I/O Card | **$375** |

## Isolated PCI I/O Cards for Real-World Industrial Control

Our PCIDIO ISO series of PCI-bus cards provides up to 64 channels of digital I/O with **optical isolation of 2,500VRMS** (***5,000VRMS for ISO32 and ISO32-I models!***) to protect your system against power surges and other potentially damaging electrical anomalies. With optical isolation, power and signal lines on the host computer have no connection with the external signals. Instead, digital signals are transmitted to and from the external devices via photocouplers. Thus, even in a situation in which the external devices experience an electrical spike, the host computer is fully protected and remains unharmed.

Our **PCIDIO ISO32** card provides 32 isolated DIO lines (16 in/16 out). The **PCIDIO ISO32-I** has 32 isolated inputs and the **PCIDIO ISO32-O** has 32 isolated outputs. PCIDIO ISO64 cards provide 64 isolated lines: the **PCIDIO ISO64** (32 in/32 out), the **PCIDIO ISO64-I** (64 in), and the **PCIDIO ISO64-O** (64 out).

PCIDIO ISO32 cards require 2 consecutive 32-bit addresses in the I/O address space (PCI data transfers are 32-bit; 8- or 16-bit I/O access is not supported). Cards in the PCIDIO ISO64 series require four consecutive 32-bit addresses.

All input channels accept up to +24VDC, and are protected by 1.2KΩ resistors (logical Low = 0~1.5V, logical High = 3 to 24V). 32-channel models (PCIDIO ISO32) can sink up to 200mA per channel and connect to the real world using a DB-37 female connector. 64-channel models (PCIDIO ISO64) can sink up to 500mA per channel and have a 100-pin high-density DB-100 connector (use **CBSCSI 10003** cable; see page 165 for cabling). Operating temperature: 32° to 140°F (0° to 60°C).

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#PCIDIO ISO32** | PCI (5V), 16 Isolated Digital Inputs & 16 Isolated Digital Outputs | **$345** |
| **#PCIDIO ISO32-I** | PCI (5V), 32 Isolated Digital Input Channels | **$345** |
| **#PCIDIO ISO32-O** | PCI (5V), 32 Isolated Digital Output Channels | **$345** |
| **#PCIDIO ISO64** | PCI (5V), 32 Isolated Digital Inputs & 32 Isolated Digital Outputs | **$495** |
| **#PCIDIO ISO64-I** | PCI (5V), 64 Isolated Digital Input Channels | **$495** |
| **#PCIDIO ISO64-O** | PCI (5V), 64 Isolated Digital Output Channels | **$495** |

***PCIDIO ISO32-I:*** ***32 Isolated I/O Lines***

***PCIDIO ISO64:*** ***64 Isolated I/O Lines***

**Tech Notes**

**Mike Mathis**

## Using Isolated Digital I/O to Protect Your System

### When do you really need it?

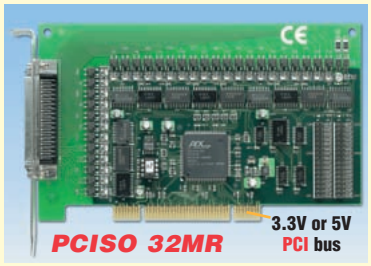
Most of our digital I/O cards, including many of our CYDIO family of cards, are reasonably priced solutions appropriate for most users. However, using one of our isolated digital I/O cards is strongly recommended when you are:

- Working in an electrically noisy environment
- Near strong magnetic fields
- Using long wire/lead lengths
- Switching inductive loads
- Near other potential sources of hazardous voltage spikes

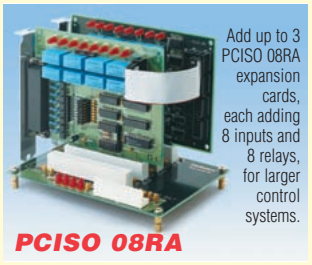
Isolated digital I/O cards can provide significant isolation between your PC (with its highly voltage-sensitive components) and your application (a potential source for voltage spikes). Most cards provide between 500 volts and 1500 volts of isolation between the connector on the card and the logic components that communicate with your PC, protecting your system against induced voltages picked up on lead wires or other hazardous voltages (which may even damage the I/O card) without commuting those spikes to your computer.

The **PCIDIO** cards on this page feature electrically isolated digital I/O. The **PCISO** cards use electrically isolated inputs and relay outputs. Other cards that provide isolated digital I/O include our **ATDIO ISO32** cards and our **ATISO** cards (see website). On page 157, our **CyPDISO** cards offer isolated inputs and relay outputs, the **CyREL** series includes models with 8, 16, 24, and 32 mechanical relays, while our **CyISO 48** can read inputs up to 24VAC or DC with 500V isolation.

If further isolation or even higher voltage control is needed, our solid-state I/O modules and mechanical relay panels on pages 154 & 156 can be used with almost any digital I/O controller. Feel free to call me with further questions.




***PCISO 32MR***




***PCISO 08RA***

### 2~32 Isolated Inputs & 8~32 Relays: Add as Needed!

Our **PCISO** boards allow you to directly connect your PC to AC or DC power lines with isolated inputs and relay outputs.

The 8 opto-isolated inputs are not polarity sensitive and may be mixed between 5~24VDC (not TTL) or AC (50~1000Hz). The PCISO 08R has one DB-37 female connector, plus three 20-pin connectors to attach **PCISO 08RA** expansion boards. The **PCISO 16R** is a PCISO 08R plus a PCISO 08RA.

The **PCISO 08R** provides 8 inputs and 8 outputs and handles PCI interfacing; it is functionally similar to the ISA-bus PCL-725 and MetraByte™ PDISO-8 series. Add up to 3 PCISO 08RAs to build a system with 32 isolated input channels and 32 relays that act as one card. See our website for detailed **PCISO 32MR** information.

Data is written to all 8 relays and is read from all 8 inputs as full bytes. Each bit controls the status of 1 relay or input line.

***Ordering Information:*** **Visit our website for detailed information.**

| | | |
|---|---|---|
| **#PCISO 08R** | PCI (5V), 8 Isolated Dig. In, 8 Relay Outputs | **$245** |
| **#PCISO 16R** | PCI (5V), 16 Isolated Dig. In, 16 Relay Outputs | **$420** |
| **#PCISO 08RA** | Adds 8 Isolated Inputs & 8 Relays to **PCISO 08R** | **$175** |
| **#PCISO 16LR** | PCI, 16 **Latching** Relays, 16 Isolated Inputs | **$395** |
| **#PCISO 32MR** | PCI, 32 Solid-State Relay Outputs, 2 Isol. In | **$395** |

# PCIDIO 3200 Series: Digital I/O at PCI-bus Speeds!

## 32 Digital Input/Output Lines • 12 or 40MB/sec Data Transfers

### *PCIDIO 3212:*

- *32-bit PCI plug-and-play*
- *Includes cable to connect the 40-pin header to a DB-37F connector on a second backplate*
- *32 TTL digital input and 32 TTL digital output channels (16 inputs and 16 outputs on each connector)*
- *Transfer rates up to 12MBytes per second*
- *On-board internal timer pacer trigger*
- *Internal timer controls input sampling rate and digital output rate*
- *On-board 64-Byte FIFO for digital input and output*
- *ACK and REQ for handshaking*
- *Multiple interrupt sources (software selectable)*
- *Low-profile PCI version available (see ordering info)*

#### Digital Inputs/Outputs (DIO)

| | |
|---|---|
| Number of Channels: | 64 total |
| I/O Configuration: | 32 Digital In and 32 Digital Out (16 in/16 out on each of 2 connectors) |
| Data Transfers: | Bus-Mastering DMA 8, 16, or 32 bits |
| I/O Signal Type: | TTL-compatible (outputs sink 8mA) |
| Input Voltage (Low): | 0V min., 0.8V max. |
| (High): | +2.0V min. |
| Input Load (Low): | +0.5V @ 0.6mA max. |
| (High): | +2.7V @ 20µA max. |
| Output Voltage (Low): | 0V min., 0.5V max. |
| (High): | +2.7V min. |
| Output Capacity (Low): | +0.5V @ 24mA max. sink |
| (High): | +2.4V @ -3.0mA max. source |

#### Programmable Counter

| | |
|---|---|
| Device Type: | 82C54 |
| Digital Input Pacer: | Timer #0 |
| Digital Output Pacer: | Timer #1 |

#### General Specifications

| | |
|---|---|
| Connectors: | DB-37 female connector (CN2) & 40-pin male header (CN1) |
| Operating Temperature: | +32°F to +140°F (0°C to +60°C) |
| Storage Temperature: | –4°F to +176°F (–20°C to +80°C) |
| Relative Humidity: | 5 to 95%, noncondensing |
| Power Consumption: | +5V @ 500mA max. |
| Dimensions: | 5.8" x 4.2" (147 x 107mm) |

### *PCIDIO 3240:*

- *32-bit PCI (5V) plug-and-play*
- *100-pin SCSI-II connector*
- *32 digital input/output channels can be configured as: 32 DI, or 32 DO, or 16 DI and 16 DO*
- *Extra 4-bit TTL digital input and output channels*
- *Transfer rates up to 80MBytes per second*
- *On-board internal clock generator*
- *Large on-board 64KB FIFO buffer*
- *ACK and REQ for handshaking*
- *Triggering/clock inputs for digital I/O*

#### Digital Inputs/Outputs (DIO)

| | |
|---|---|
| Number of Channels: | 32 total |
| I/O Configurations: | 32 In, 32 Out, or 16 In and 16 Out |
| Data Transfers: | Bus-Mastering DMA (programmable: 8, 16, or 32 bits) |
| Max. Transfer Rate: | 40MB per second; 80MB per second as a 32-bit pattern generator @ 20MHz |
| FIFO Buffer: | 64KB (32K for Port A, 32K for Port B) |
| Current Sink: | TTL-compatible or 48mA (user-selectable) |

#### Auxiliary Digital I/O

| | |
|---|---|
| Number of Channels: | 4 Digital Inputs, 4 Digital Outputs |
| I/O Signal Type: | TTL-Compatible<br>Passive terminators on 4 digital inputs (330Ω pulled high; 200Ω low) |
| Data Transfer Mode: | Program I/O |

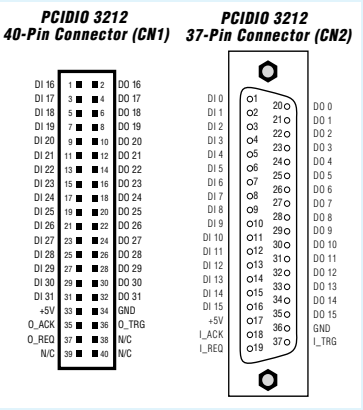
#### Programmable Counter

| | |
|---|---|
| Device Type: | 82C54 |
| Digital Input Pacer: | 20MHz, 10MHz, or Clock output of Timer #0 |
| Digital Output Pacer: | 20MHz, 10MHz, or Clock output of Timer #1 |

#### General Specifications

| | |
|---|---|
| Connector: | 100-pin SCSI-II style connector |
| Operating Temperature: | +32°F to +140°F (0°C to +60°C) |
| Storage Temperature: | –4°F to +176°F (–20°C to +80°C) |
| Relative Humidity: | 5 to 90%, noncondensing |
| Power Consumption: | +5V @ 500mA max. |
| Dimensions: | 7.1" x 4.2" (179 x 107mm) |

CyberResearch's PCIDIO 3200 boards are half-length plug-and-play cards designed to provide ultrahigh-speed data transfers.




The **PCIDIO 3212** features data transfer rates up to 12MB/sec. on its 32 input and 32 output lines (there are 16 inputs and 16 outputs on each of the two connectors). The 64-byte buffer is configured as a 32-byte FIFO buffer for input, and a 32-byte buffer for output.

**PCIDIO 3240**

| | | | |
|---|---|---|---|
| GND | 1 | 51 | PB 15 |
| GND | 2 | 52 | PB 14 |
| GND | 3 | 53 | PB 13 |
| GND | 4 | 54 | PB 12 |
| GND | 5 | 55 | PB 11 |
| GND | 6 | 56 | PB 10 |
| GND | 7 | 57 | PB 9 |
| GND | 8 | 58 | PB 8 |
| GND | 9 | 59 | PB 7 |
| GND | 10 | 60 | PB 6 |
| GND | 11 | 61 | PB 5 |
| GND | 12 | 62 | PB 4 |
| GND | 13 | 63 | PB 3 |
| GND | 14 | 64 | PB 2 |
| GND | 15 | 65 | PB 1 |
| GND | 16 | 66 | PB 0 |
| GND | 17 | 67 | DO_ACK |
| GND | 18 | 68 | DO_REQ |
| GND | 19 | 69 | DO_TRG |
| GND | 20 | 70 | AUX OUT 3 |
| GND | 21 | 71 | AUX OUT 2 |
| GND | 22 | 72 | AUX OUT 1 |
| GND | 23 | 73 | AUX OUT 0 |
| GND | 24 | 74 | |
| GND | 25 | 75 | Terminator Power Out (4.7V) |
| GND | 26 | 76 | |
| GND | 27 | 77 | |
| GND | 28 | 78 | AUX IN 3 |
| GND | 29 | 79 | AUX IN 2 |
| GND | 30 | 80 | AUX IN 1 |
| GND | 31 | 81 | AUX IN 0 |
| GND | 32 | 82 | DI_ACK |
| GND | 33 | 83 | DI_REQ |
| GND | 34 | 84 | DI_TRG |
| GND | 35 | 85 | PA 15 |
| GND | 36 | 86 | PA 14 |
| GND | 37 | 87 | PA 13 |
| GND | 38 | 88 | PA 12 |
| GND | 39 | 89 | PA 11 |
| GND | 40 | 90 | PA 10 |
| GND | 41 | 91 | PA 9 |
| GND | 42 | 92 | PA 8 |
| GND | 43 | 93 | PA 7 |
| GND | 44 | 94 | PA 6 |
| GND | 45 | 95 | PA 5 |
| GND | 46 | 96 | PA 4 |
| GND | 47 | 97 | PA 3 |
| GND | 48 | 98 | PA 2 |
| GND | 49 | 99 | PA 1 |
| GND | 50 | 100 | PA 0 |

The **PCIDIO 3240** is our fastest I/O card, capable of data transfer rates up to 40MB/sec. The card's 32 I/O lines can be used as 16 input lines and 16 outputs, all 32 as inputs, or all 32 as outputs. 16KWORDS/64KB of buffer memory (32KB FIFO per port) simplifies programming.

Both cards can be used for digital waveform generation, and support bus-mastering DMA transfers (the PCIDIO 3240 includes built-in hardware support for scatter/gather DMA, allowing it to move data to and from non-contiguous memory blocks). Each card has an internal timer to control the pacer trigger, input sampling rate, and digital output rate.

A collection of drivers, DLLs, and other programming tools is included to simplify the process of creating custom programs. The utility disk includes mini-applications for testing, initialization, reading & writing to I/O channels, DMA memory management, and other routine but necessary tasks.

***Ordering Information:*** **See pp. 150~152 for our DIO comparison chart; visit our website for more info.**

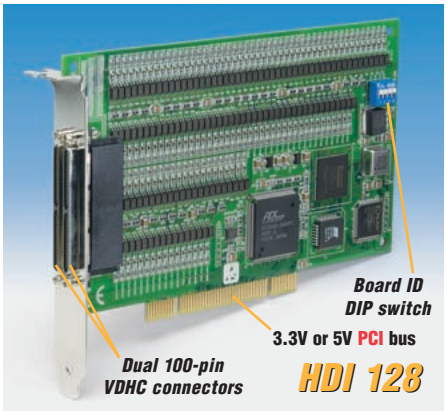
**#PCIDIO 3212** **PCI (5V)** 32 Digital Inputs and 32 Digital Outputs (12MB/sec).....**$395**
**#PCIDIO 3212L** **PCI** Low-Profile Version of PCIDIO 3212 (2.6"**H**; 2 x 68-pin connectors; see website for details).....**$495**
**#PCIDIO 3240** **PCI (5V)** 32 Digital Inputs, or 32 Digital Outputs, or 16 DI *&* 16 DO (40MB/sec), + 4 in & 4 out..**$995**

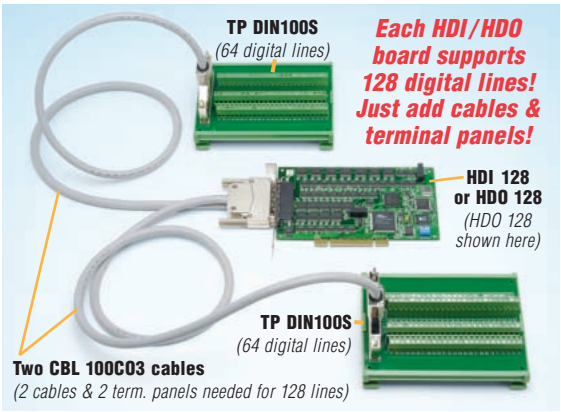
Each PCIDIO card comes with utility software and a variety of drivers for diffrent operating systems and programming packages. For a complete list of currently available drivers, please visit our website.

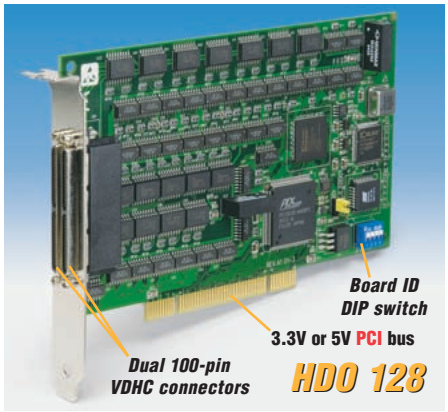

www.cyberresearch.com
Visit our website for detailed product information!
Toll-Free Assistance: 1-800-341-2525 (USA) Tel: 203-643-5000 Fax: 203-643-5001
Applications Engineers: Monday – Friday, 9:00 AM – 5:00 PM, U.S. Eastern Time • e-mail: info@cyberresearch.com

# HDI 128 & HDO 128: Optically Isolated Digital Input and Output Boards

## 2500VDC Optical Isolation • Temperatures Up to 140°F • 90 mA Sink





TP DIN100S
(64 digital lines)
Each HDI/HDO board supports 128 digital lines! Just add cables & terminal panels!
HDI 128
or HDO 128
(HDO 128 shown here)
TP DIN100S
(64 digital lines)
Two CBL 100C03 cables
(2 cables & 2 term. panels needed for 128 lines)




Our **HDI 128** digital input and **HDO 128** digital output boards feature a full 2,500VDC of isolation for applications in industry, laboratories, and anywhere near high voltage sources.

The HDI 128 accepts input voltages from 5~25VDC, so it is suitable for 12 and 24VDC systems. HDO 128 provides output voltages from 5~40VDC. The HDO board also sink 90 mA on each output channel. All output lines are user-configurable for logical high and low output. A DIP switch on each board helps define each card's ID when multiple cards are installed into one PC.

The hot-reset default output configuration of the HDO model is to set all outputs at logical 0. If you prefer, you can set a jumper to provide "last state" on all outputs after a hot reset. Each output can be programmed individually for initial startups.

All HDI/HDO boards have dual 100-pin VDHC connectors on their brackets. Therefore, each card requires two cables and two terminal panels to accommodate all 128 input or output signals. Typical cabling is shown in the center illustration, above.

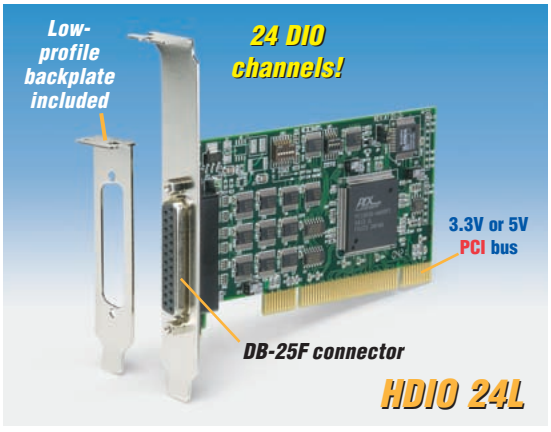
***Ordering Information:*** **Visit cyberresearch.com for detailed info.**

| | | |
|---|---|---|
| **#HDI 128** | 128-Channel PCI Isolated Digital Input Card | **$695** |
| **#HDO 128** | 128-Channel PCI Isolated Digital Output Card | **$695** |
| **#TP DIN100S** | 100-pin DIN-Mt. Term. Pnl, SCSI-100 (2 recommended) | **$109/ea** |
| **#CBL 100C03** | 100-pin 3-ft Cable, VDHC-100 to SCSI-100 (2 recommended) | **$125/ea** |

For a complete list of drivers and utilities please visit our website.. For general specifications, see p. 150. For additional cables and terminal panels, see p. 138.

# HDIO 24L: High-Current Board Ideal for Hot Spots

## 2 x 8-bit + 2 x 4-bit Ports • Temperatures Up to 158°F • 24 mA Sink




Resistance to high temperatures and plenty of sink current make our new **HDIO 24L** ideal for input/output applications in industrial areas near furnaces and heat-treating facilities.

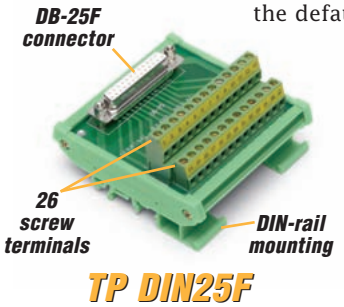
The HDIO 24L emulates an 8255 PPI chip for convenient, conventional programming. Port C Pin 0 and Port C Pin 4 can also be used to provide interrupts to your PC system.

A simple jumper allows you to select what happens to port settings and output values when the system is hot reset (power is not turned off). You can retain the latest settings or return to the default settings.

- **Digital I/O:**
  - Number of Channels: 24
  - Number of Ports: 2 x 8-bit & 2 x 4-bit, software selectable
  - Input High Voltage: 2.0 VDC minimum
  - Input Low Voltage: 0.80 VDC maximum
  - Input Current: 2 µA maximum
  - Output High Voltage: 3.7 VDC minimum
  - Output Low Voltage: 0.5 VDC maximum
  - Output Current: 24 mA (source), –24 mA (sink)
  - Interrupt Sources: Port C pin 0, Port C Pin 4
  - Input/Output Selection: Software programmable
- **General Specifications:**
  - Connector: DB-25F
  - Programming Mode: 8255 PPI, Mode 0
  - Power Consumption: 5 V @ 200 mA (typical)
  - Dimensions: 4.72"L x 2.54"H (120 x 64 mm)
- **Environmental Specifications:**
  - Operating Temperature: +32° to +158°F (0° to 70°C)
  - Storage Temperature: –4° to +176°F (–20° to +80°C)
  - Relative Humidity: 5 to 95%, noncondensing

### HDIO 24L Connector

| | | | |
|---|---|---|---|
| Port B Pin 4 | 13 | 25 | Ground |
| Port B Pin 3 | 12 | 24 | Port C Pin 7 |
| Port B Pin 2 | 11 | 23 | Port C Pin 6 |
| Port B Pin 1 | 10 | 22 | Port C Pin 5 |
| Port B Pin 0 | 9 | 21 | Port C Pin 4 |
| Port A Pin 7 | 8 | 20 | Port C Pin 3 |
| Port A Pin 6 | 7 | 19 | Port C Pin 2 |
| Port A Pin 5 | 6 | 18 | Port C Pin 1 |
| Port A Pin 4 | 5 | 17 | Port C Pin 0 |
| Port A Pin 3 | 4 | 16 | Port B Pin 7 |
| Port A Pin 2 | 3 | 15 | Port B Pin 6 |
| Port A Pin 1 | 2 | 14 | Port B Pin 5 |
| Port A Pin 0 | 1 | | |




***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| **#HDIO 24L** | 24-Channel PCI Low-Profile DIO Card (2 x 8 & 2 x 4 ch.) | **$120** |
| **#TP DIN25F** | 25-pin Terminal Panel, DB-25F connector | **$35** |
| **#CBL 2503MM** | 25-pin Round Shielded Cable, DB-25 M-M, 3 feet | **$15** |
| **#CBL 2506MM** | 25-pin Round Shielded Cable, DB-25 M-M, 6 feet | **$18** |
| **#CBL 2510MM** | 25-pin Round Shielded Cable, DB-25 M-M, 10 feet | **$20** |

For a complete list of drivers and utilities please visit our website.

**QUANTITY DISCOUNTS: 1-4/LIST 5-9/5% 10-24/10% 25+/CALL** Quantities of a Single Item Per Shipment – Call for Details

# Frequency/Time Measurement and Pulse Generation

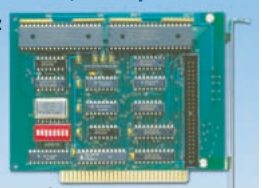
**CyCTM 05P** 5-ch. Counter/Timer
Five 16-bit counters, one DB-37 connector

ISA model available: CyCTM 05
8 digital outputs, 8 digital inputs

**CyCTM 10** 10-ch. Counter/Timer
Ten 16-bit counters, two DB-37 connectors

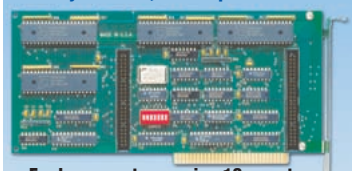
*Use #CBL 3700 for easy wiring to 2nd conn.*
Up to 7 MHz, fully programmable
16 digital outputs, 16 digital inputs

**CyCTM 10H** 10-ch. Counter/Timer
Ten 16-bit counters, one 50-pin connector




All 10 counters & more on one connector.
Programmable interrupt to PC IRQ2~7

**CyCTM 20H** 20-ch. Counter/Tmr
Twenty counters, two 50-pin connectors



Each connector carries 10 counters, in/out, gates, interrupt in, +5V & ground.
Higher-accuracy '20HX' model available

Our **CyCTM** CTS 9513-based counter/timer boards feature:

- **5, 10, or 20 Counter/Timers** (using 1, 2, or 4 CTS 9513 chips) with inputs ranging from DC to 7 MHz (max); offering Square, Pulse, One-Shot, and Complex outputs.
- Each 9513 chip provides 5 independent 16-bit counters (65,536 count) which may be chained via software, enabling a 32, 48, 64, or 80-bit counter to be constructed within each 9513 chip. The gate source and gating functions are software programmable, and may be reconfigured as counter inputs. Daisy-chaining across multiple 9513 chips is possible with a single wire, allowing construction of up to 160-bit counters. Up or down counting may be maintained in binary or BCD.
- The **CyCTM 05** & **10** have 8 or 16 digital inputs and 8 or 16 high-current digital output lines (64 mA) to drive solid-state relays, LEDs, and mechanical relays directly. Includes an on-board 1 MHz crystal oscillator and jumper-selectable interrupt (IRQ) level.
- Our **CyCTM 10H** & **20H** feature a programmable clock source. Choose from three fully programmable on-board sources of pulses to the 9513: External, 1 MHz, or 5 MHz Crystal. Your choice of PC interrupts IRQ2-IRQ7; interrupts can be used to initiate program execution on terminal count, set off an alarm, or reconfigure counters after a prescribed interval. *(No digital I/O on H models.)*
- To supply a more precise source of timing pulses, "**X**" versions of our cards come with a high-accuracy 50 parts-per-million crystal (XTAL) in place of the standard 100ppM XTAL. A variety of internal and external frequency sources may be selected as inputs for various counters.
- Universal Driver and LabVIEW™ Libraries included.

Our CyCTM series of counter/timer boards are ideally suited for applications where 5, 10, or 20 counters are required, such as:

- event counting
- frequency & pulse output
- frequency synthesis
- retriggerable digital timing
- time-of-day clocking
- alarm timing/comparator
- complex pulse generation
- frequency shift keying
- stop-watch timing
- event count accumulation
- waveform analysis
- and many more

On CyCTM counter/timer boards, the internal 1 MHz frequency source can be used to control the tapped frequency output. Channels 1 & 2 have alarm comparators and registers. They can run in 24-hour time-of-day mode, and accept 50, 60, or 100 Hz input frequencies — ideal for real-time and process control. Input, output, gating, polarity, and source options are all programmable.

***Ordering Information:*** **Visit cyberresearch.com for detailed information.**

| | | |
|---|---|---|
| #**CYCTM 05** | **ISA** 5-Ch. Counter/Timer Board, 16 DIO, 100 ppM, 37-pin | $245 |
| #**CYCTM 05X** | High-Accuracy (50 ppM) Version of CYCTM 05 | $345 |
| #**CYCTM 05P** | **PCI (5V)** Version of CYCTM 05 (16 DIO, 100 ppM, 37-pin) | $245 |
| #**CYCTM 10** | **ISA** 10-Ch. Counter/Timer Board, 32 DIO, 100 ppM, 37-pin | $495 |
| #**CYCTM 10X** | High-Accuracy (50 ppM) Version of CYCTM 10 | $595 |
| #**CYCTM 10P** | **PCI (5V)** Version of CYCTM 10 (32 DIO, 100 ppM, 37-pin) | $395 |
| #**CYCTM 10H** | **ISA** 10-Ch. Counter/Timer Board, 100 ppM, 50-pin | $495 |
| #**CYCTM 10HX** | High-Accuracy (50 ppM) Version of CYCTM 10H | $595 |
| #**CYCTM 20H** | **ISA** 20-Ch. Counter/Timer Board, 100 ppM, 50-pin | $695 |
| #**CYCTM 20HX** | High-Accuracy (50 ppM) Version of CYCTM 20H | $795 |

All CyCTM models listed above include our Universal Driver and LabVIEW™ Libraries as well as drivers for Windows 2000 & XP. See pp. 140~141 for terminal panels & cables.

## Tech Notes

Mike Mathis

## The CTS 9513 Counter/Timer

Our CyCTM-series boards are based on the CTS 9513 System Timing Controller chip. This chip replaces the older AMD 9513.

One significant advantage of the CTS 9513 is its higher speed. Instead of the 7 MHz limit of the older chip, the CTS 9513 accepts a 20 MHz maximum input clock signal, which allows timing resolutions of up to 50 ns and gate pulses as short as 50 ns. Other key differences are addressed in the user manuals for all products featuring this particular counter/timer.

The CTS 9513 is addressed as two locations: a control port and a data port. The control port provides direct access to the Status register, Command register, and the data-point register. The data port is used to communicate with all other addressable internal locations.

Each of the five general-purpose counters is independently controlled by its Counter Mode register. Through this register, you can select one of 16 sources as the counter input, a variety of gating and repetition modes, up or down counting , and active-high or active-low input and output polarities. A Master Mode register controls options not pertaining to one of the five counters.

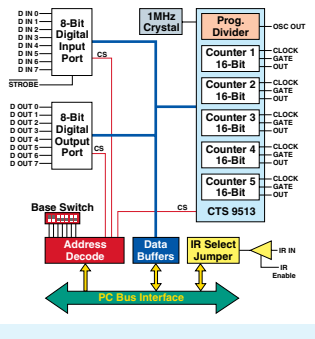
There are 24 different preset operating modes. They include software and hardware-triggered one-shot pulses. You select Mode A through X by setting three bits in the Counter Mode register.

A Load Register and a Hold Register are associated with each counter. The Load register automatically reloads the counter to any predefined value, to control the effective count period. The Hold Register saves intermediate counts without disturbing the count process, or generates complex output waveforms when it is used as a second Load Register.

A powerful command structure simplifies user interaction with the counters. ARM and DISARM commands permit software gating of the count process. The LOAD command reloads the counter with the value stored in either the Load or the Hold register. It may be used as a retrigger or for counter initialization. A SAVE command transfers the contents of a counter to its Hold register. The DISARM command disables further counting. The STEP command increments or decrements the counter. Additional commands are provided to set or clear an output toggle, issue a reset, or clear and set special bits. Detailed information is provided in user manuals.

Counters work best when the inputs have sharp, clean edges. To provide them, our **STA 01** Universal Screw Terminal Panel (page 141) has space for voltage dividers and low-pass filter circuits. To debounce a counter input, populate one of the low-pass filter circuits and connect it to the counter's input signal.

**CYCTM 05 Block Diagram**




See pp. 144, 146, and 160 for additional Counter/Timer modules. Call for details on multifunction cards with built-in counter/timers.

# Terminal Panels and Cabling Accessories for Digital I/O

***Ordering Information:*** **Visit cyberresearch.com for more information.**

**100-pin SCSI-style Conn. Terminal Panels** (use with 100-pin cable: **CBSCSI 10003**)

**#TP DIN100S** 100-pin Terminal Panel, DIN-mount (SCSI conn.) 3 .....$109

**#TPB DIN502S** Terminal Panel & Cable Set: (**100-pin SCSI** to two 50-pin panels)
*Includes two* **TPB DIN50S** *panels & a* ***3-ft. shielded "Y" cable*** – see photo 4 .....$249

**#CYSTP 100HDE** Terminal Panel w/Steel Enclosure (100-pin SCSI conn.) 8 ..$195

**#TP DIN96DO** 96-line Isolated Digital Output Panel, DIN-mount (100-pin SCSI)
Opto-isol. 35VDC Darlington outputs can drive relays, sinks 60~370mA/line 1 ...$395

**#TP DIN96DI** 96-line Isolated Digital Input Panel, DIN-mount (100-pin SCSI)
Isolated AC/DC voltage inputs for 5/12/24V systems; use w/**PCIDIO 96HA** 2 ....$395

**50-pin SCSI-II Connector Terminal Panel** (use with 50-pin cable: **CBSCSI 5003**)

**#TPB DIN50S** 50-pin Barrier Strip Term. Pnl., DIN-mt. Spade Lug, SCSI-II 4 .$89
Our **TP DIN5024ISO** 6, **TP DIN5024R** 5, & **TP DIN5024R-24** 5 also have SCSI-II connectors.

**50-pin Header Connector Terminal Panels** (use w/50-pin cables: **CBL 5002/5005**)

**#TP DIN50** 50-pin Terminal Panel, DIN-mount 11 *(cable not included)*.....$89

**#CYSTP 50** 50-pin Mini Terminal Panel 12 *(cable not included)*.....$65

**#STA 100** 100-Terminal Panel (two 50-pin headers) 14 .....$145

**#CYSTP 502E** 100-Terminal Panel with Steel Enclosure (two 50-pin) 7 ..$195

**#TP DIN5024R** 50-pin (Opto-22) 24-Relay Panel, DIN-mount (12V coils) 5 ....$295

**#TP DIN5024R-24** 50-pin (Opto-22) 24-Relay Panel, DIN-mount (24V coils) 5 ....$295
Use w/Opto 22-compatible 50-pin digital I/O or **CM 4058** CyMOD module. 24 SPDT (form C) relays; UL/CSA ratings: 0.6A@125VAC, 0.6A@110VDC, 2A@30VDC. Switching: 60W/120VA, 220VDC/250VAC max. +12V (**DIN5024R**) or +24V (**DIN5024R-24**) power required for relays; LEDs show status of signals.

**#TP DIN5024ISO** 50-pin 24 Opto-Isolated Digital Input Panel, DIN-mount 6 ..$185
Use with Opto 22-compatible 50-pin header (or SCSI-II connector for **CM 4058** CyMOD module, pp. 146~147). Set inputs individually to dry contact sensing or isolated voltage input channel-by-channel! 3~24VDC or 6.3~50mA adjustable threshold with 5000VDC optical isolation; LEDs show status of signals.

**#TP 5024R** 50-pin, 24-Relay Panel (Opto-22 compatible, 12V coils) 9 ....$259

**#TP 5024R-24** 50-pin, 24-Relay Panel (Opto-22 compatible, 24V coils) 9 ....$269
Use with Opto 22-compatible 50-pin digital I/O. 24 SPDT (form C) relays; 60W@120VAC, 250VAC max; +12V (**5024R**) or +24V (**5024R-24**) power required for relays; LEDs show status of signals.

**#TP 5024ISO** 50-pin, 24 Opto-Isolated Digital Input Panel 10 .....$169
Use w/ Opto 22-compatible 50-pin DIO connectors. 3 to 24VDC or 6.3 to 50mA in; 3~24VDC adjustable threshold; 2500VDC isolation; LEDs for signal status. Spade Lugs, 50-pin cable required.

**37-pin DB-37F Connector Terminal Panel** (use w/37-pin cables: **CBL 3703/06M**)

**#TP DIN37D** 37-pin Terminal Panel, DIN-mount 15 *(cable not included)*.....$89

**#TPB 37** 37-pin/20-pin Barrier Strip Term. Panel 13 *(cable not incl.)* .....$79

**#CYSTP 372E** Terminal Panel w/ Steel Enclosure (two 37-pin; similar to 7)...$195

**20-pin Header Connector Terminal Panels** (supplied with 3-ft. 20-pin ribbon cables)

**#TP DIN20** 20-pin Panel, DIN-mount 16 (20-pin male header, ***includes cable***) ..$79

**#TP 20** 40-pin (two 20-pin conn.) Terminal Panel ***w/2 cables*** 18 .....$59
Breaks out two 20-pin headers to 40 terminals, w/space for signal conditioning components; ***includes two 20-pin cables.***

**#TP 2016R** 20-pin, 16-ch. Relay Output Terminal Panel 19 .....$179
Use with 20-pin digital I/O header. 16 SPDT (Form C) Relays; 120VAC@0.5A or 30VDC@1A, resistive; +12V power required for relays; LEDs show status of signals. ***3-ft. cable (CBL 2003) included.***

**#TP 2016ISO** 20-pin, 16-ch. Opto-Isolated Dig. Input Panel 20 .....$149
Use with 20-pin Digital I/O. 0 to 24V AC or DC in; 1.5VDC threshold; 1000VDC Isolation; LEDs show status of signals. ***A 3-foot 20-pin cable (CBL 2003) is included.***

**Cables** *Please order cables with terminal panels (20-pin panels come w/ CBL 2003).*

**#CBL 2003** 20-pin 3-ft. F-F Flat-Ribbon Cable (cable similar to 23).....$12

**#CBL 2003S** 20-pin 3-ft. F-F Round Shielded Cable w/ground wire 17 .....$25

**#CBL 2006S** 20-pin 6-ft. F-F Round Shielded Cable w/ground wire 17 .....$35

**#CBL 3703MR** 37-pin 3-ft. Flat-Ribbon Cable (M-to-M, cable similar to 23) ..$25

**#CBL 3703M** 37-pin 3-ft. Round Shielded Cable (M-to-M) 22 .....$29

**#CBL 3706M** 37-pin 6-ft. Round Shielded Cable (M-to-M) 22 .....$39

**#CBL 3703MF** 37-pin 3-ft. Round Shielded Cable (M-to-F) 22 .....$29

**#CBL 3720H** Backplate Adapter: DB-37F to two F 20-pin headers 21 .....$25

**#CBL 5002** 50-pin 2-ft. F-F Flat-Ribbon Cable 23 .....$25

**#CBL 5005** 50-pin 5-ft. F-F Flat-Ribbon Cable 23 .....$35

**#CBSCSI 5003** 50-pin 3-ft. SCSI-II Shielded Cable (M-to-M) 24 .....$39

**#CBSCSI 10003** 100-pin 3-ft. SCSI-style Shielded Cable (M-to-M) 25 .....$69

**#CBSCSI 5203** 100-pin SCSI-style Cable to two 50-pin SCSI-II conn. 4 ..$99

**#CBL MOLBP** PC Power 3-way Splitter on an expansion slot backplate 26 ....$25
Connects to PC power supply internally. Provides 3 Molex conn's with +5V & GND on a backplate.

**TP DIN96DO** DIN-mount, 96 relay drivers 1
Darlington outputs, 35VDC @60~370mA sink per line. 2500V isol.
SCSI-style 100-pin connector
1.8"H x 8.9"L x 4.4"W

**TP DIN100S** DIN rail or desktop terminal panel 3
100-pin SCSI-style connector
100 screw terminals
6.2"L x 4.4"W

**TP DIN96DI** 96 isolated digital input panel 2
AC or DC, polarity-free, for 5~24V systems. 2500V isol.
SCSI-style 100-pin connector
1.8"H x 8.9"L x 4.4"W

**TPB DIN502S** **Cabling Package:** 2 **TPB DIN50S** panels & **CBSCSI 5203** 3-ft. cable 4
Barrier strip term. panels
SCSI-style 100-pin connector to two 50-pin panels
4.9"L, 3.0"W each

**TP DIN5024R** Panel with 24 SPDT relays
0.6A@125VAC. Order w/12V or 24VDC coils.
50-pin header and SCSI-II connectors
8.0"L x 4.4"W
+12/24VDC req'd for relays. 5

**CYSTP 100HDE** Terminal panel with enclosure
100 screw terminals; strain relief for wiring; hinged-cover steel enclosure with rubber feet.
100-pin SCSI
100-pin female SCSI-style connector
1.8"H x 6.3"W x 7.2"D 8

**CYSTP 502E** Two 50-pin male headers
7 *CYSTP 372E is visually similar*

**TP DIN5024ISO** 24 isol. digital input panel
3~24VDC or 6.3~50mA in.
50-pin header & SCSI-II conn's.
10.2"L x 4.4"W
Set inputs to voltage or dry contact. 6

**TP 5024R** Output panel with 24 SPDT relays
60W@120VAC, +12/24VDC power req'd for relays.
50-pin male header conn.
8.7"L x 5.2"W 9

**TP DIN50** DIN-rail or desktop terminal panel 11
50-pin male header connector
5.7"L x 3.1"W

**TP 5024ISO** 24 isolated digital input panel
3~24VDC or 6.3~50mA in; 2500V isol.
50-pin male header connector
8.7"L x 5.2"W 10

**CYSTP 50** 12
50-pin male header connector
56 screw terminals including 6 user terminals (to solder holes A~F)
4"L x 4"W

**TPB 37** Barrier strip terminal panel
37-pin female DB-37 conn.
20-pin headers
For 37-pin or 20-pin boards
8.1"L x 4.5"W 13

**STA 100** 100 screw terminals, two 50-pin conn.
Two 50-pin male header connectors
16"L x 4"W 14

**TP DIN37D** DIN-rail or desktop
37-pin female DB-37 connector
4.5"L x 3.1"D 15

**TP DIN20** 16
Male 20-pin header with 3' F-F ribbon cable
2.0"H 2.7"L x 3.0"D

**CBL 2003S/2006S**
Shielded cable, 20-pin headers, F-F 17

**TP 20** 2 x 20-pin
4.0"L x 4.5"W 18

**TP 2016R** 16 relay digital outputs
16 SPDT relays 8.1"L x 4.5"W 19

**TP 2016ISO** 16 isol. digital inputs
1000V isolation 8.1"L x 4.5"W 20

**CBL 3720H** 21
Backplate adapter: 37-pin DB-37 connector
to two 20-pin headers, 10" long.
Brings 20-pin I/O to rear of PC.

**CBL 3703MF** DB-37 connectors
Shielded cable 22
3-foot M-F extension cable

**CBL 3703M CBL 3706M**
Shielded cable
3 or 6-foot M-M 37-pin cable

**CBL 5002 & 5005** 23
50-pin header connectors, female-female

**CBSCSI 5003** 24
Shielded cable
Male-male 50-pin SCSI-II connectors

**CBSCSI 10003** 25
Shielded cable
3-foot cable, SCSI-style conn., M-M

**CBL MOLBP**
+5V & GND from 26 power supp. to three rear-of-PC Molex conn.